Public Utilities

Volume 58 No. 4 August 16, 1956

Kellogg's Design Calculation Techniques Keep Pac

Latest and most valuable electronic addition to The M. W. Kellogg Company's facilities for solving the design calculation problems of power piping customers is a new, large magnetic drum digital computer. It can execute 500 arithmetical operations per second; conservatively can solve 40 simultaneous equations in 30 minutes; and has a memory capacity of over 4000 ten-digit words. This computer is now in use at Kellogg's new New York Headquarters, and supplements a smaller computer which has been employed for some time at M. W. Kellogg's Jersey City laboratories.

This new computer enables The M. W. Kellogg Company's engineering staff to undertake a far greater number of precise calculations in less time than ever before and, as a result, to determine the optimum main and reheat steam piping designs for steam-electric power plants in minimum time.

A cordial invitation to see the new Datatron computer at work is extended to consulting engineers, and to engineers of power generating companies and their equipment manufacturers. Appointments may be made by contacting the office of the Sales Manager, Fabricated Products Division, The M. W. Kellogg Company, 711 Third Avenue, New York 17, N. Y.

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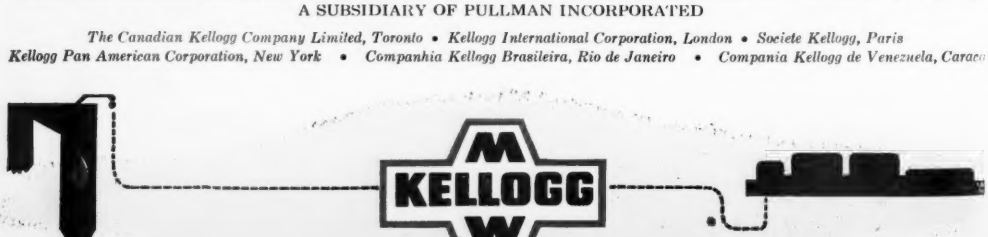

POWER PIPING—THE VITAL LINK

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Public Utilities
FORTNIGHTLY

VOLUME 58 AUGUST 16, 1956 NUMBER 4

ARTICLES

FEATURE SECTIONS

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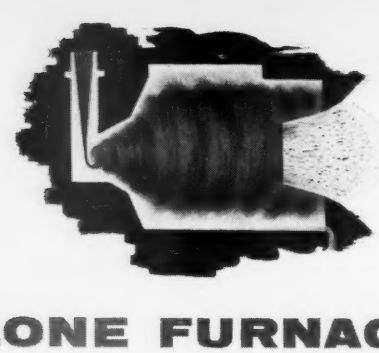


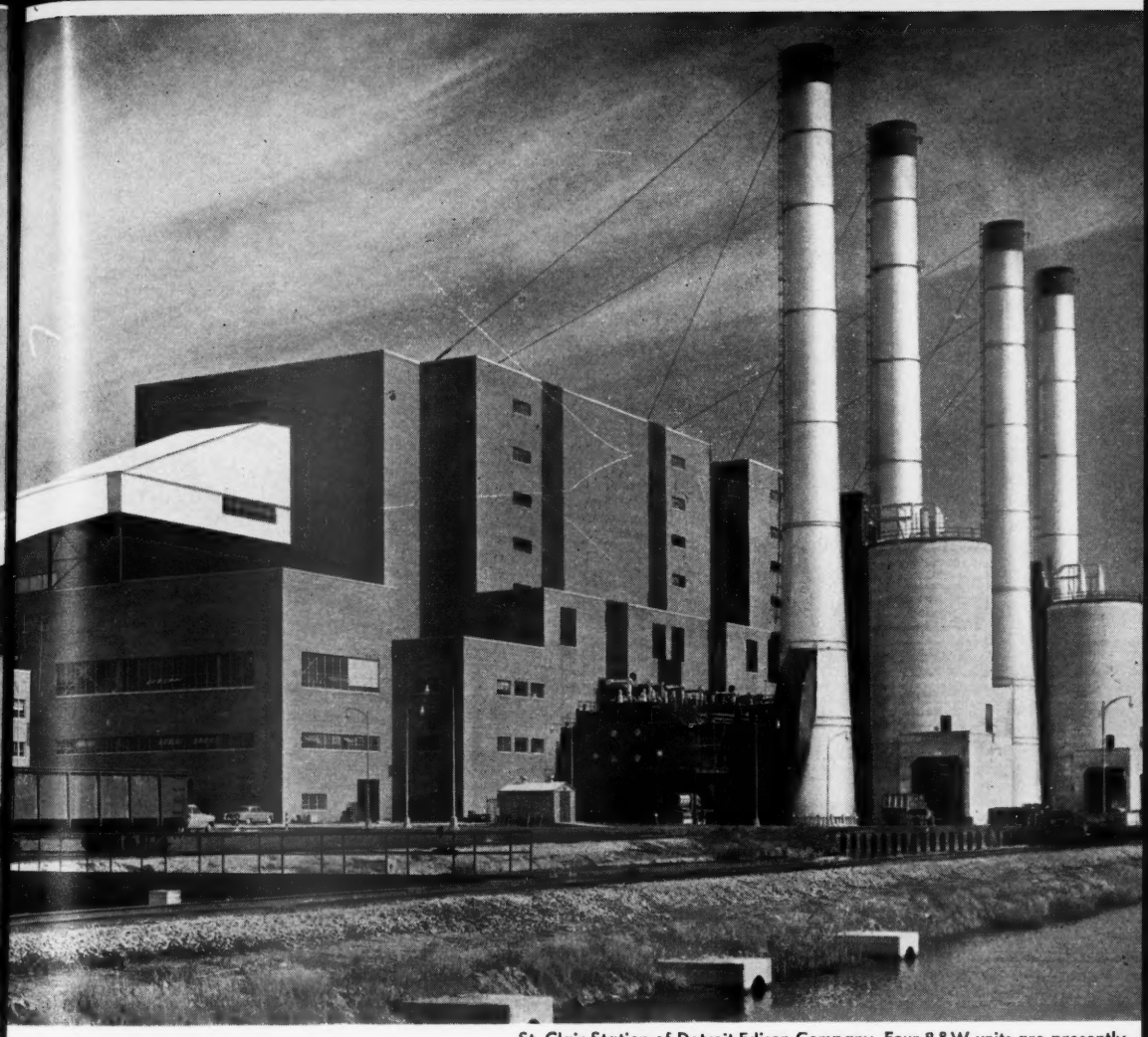
CYCLONE FURNACE FOR ST. CLAIR

Detroit Edison Company's pioneering of more efficient power generation with better boilers, larger turbines and technical improvements of many kinds takes another step forward with the selection of Cyclone Furnace-fired B&W Radiant Reheat Boilers for St. Clair Station.

The new generating unit will provide guaranteed capability of 325,000 kw, and the boiler will deliver 2,100,000 lb of steam per hr at 2450 psi and 1050 F at the superheater outlet. Reheat temperature is 1000 F.

ELIMINATION OF HEAVY FLY-ASH DISCHARGE WITH CYCLONE FURNACES

Cyclone Furnace Boilers offer many advantages. One important feature is the elimination of heavy fly-ash discharge from the stack. Most of the ash from the burning coal is melted into easy-to-handle slag right in the Cyclone Furnace. This ash never gets into the gas stream, with the result that dust loading is reduced to very small amounts.



St. Clair Station of Detroit Edison Company. Four B&W units are presently in operation, and a fifth unit—Cyclone Furnace-fired—is now on order.

The Cyclone Furnace offers many other benefits. Through simplification of the entire process of coal separation, combustion, ash segregation, and ash handling, it makes possible economies in inital cost, operating labor and fuel consumption. Maintenance costs are cut because so much maintenance-causing machinery is eliminated. These are some of the reasons why fifty-six boilers of all sizes are now in operation or on order with a total of over 130 Cyclone Furnaces.

CLEAN STEAM WITH CYCLONE SEPARATORS

Adequate circulation of water throughout the boiler even at the high design pressure of 2700 psi for the St. Clair unit—is assured with safety by B&W's efficient Cyclone Steam Separators. Located inside the drum, these simple, stationary devices require no power, need no maintenance, do not take up building room. In conjunction with Steam Scrubbers, the Cyclone Separators make it possible to send steam of highest purity to the turbine, contributing to greater turbine efficiency and decreasing the amount of turbine cleaning required.

* * *

These and many other modern advances in combustion and high-pressure, high-temperature steam generation are available to you. We will be glad to discuss them with you in connection with your future plans. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-794

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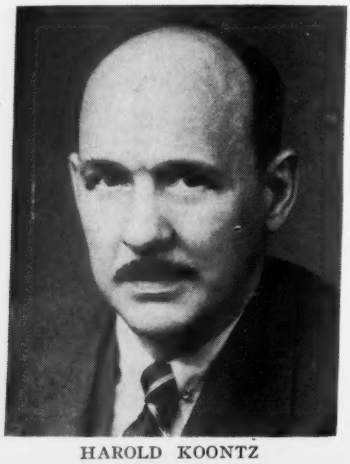
BOILER DIVISION

Pages with the Editors

CAN there be such a thing as too much regulation of a utility? Or to put the question more fairly, can there be such a thing as the burden of regulation becoming unfair because of the existence of competitive business operations which are *not* regulated? In recent years, the railroad industry has been complaining that it is getting more and more into the position of being forced to fight for business with vigorous unregulated competition with one hand tied behind its back by the ICC.

THE evidence is not all in yet nor have the congressional committees concluded their deliberations, but it begins to appear probable that Congress will eventually take action to relieve carriers of freight for hire from intricate federal regulation. The House Interstate and Foreign Commerce Committee has been holding a series of hearings on two bills to re-establish competition as the principal feature of rate regulation, and it has heard considerable evidence favorable to the change.

AMONG the witnesses who appeared before the committee was Secretary of Commerce Weeks, who also was chairman of the Presidential Advisory Committee on Transport Policy and Organization. He



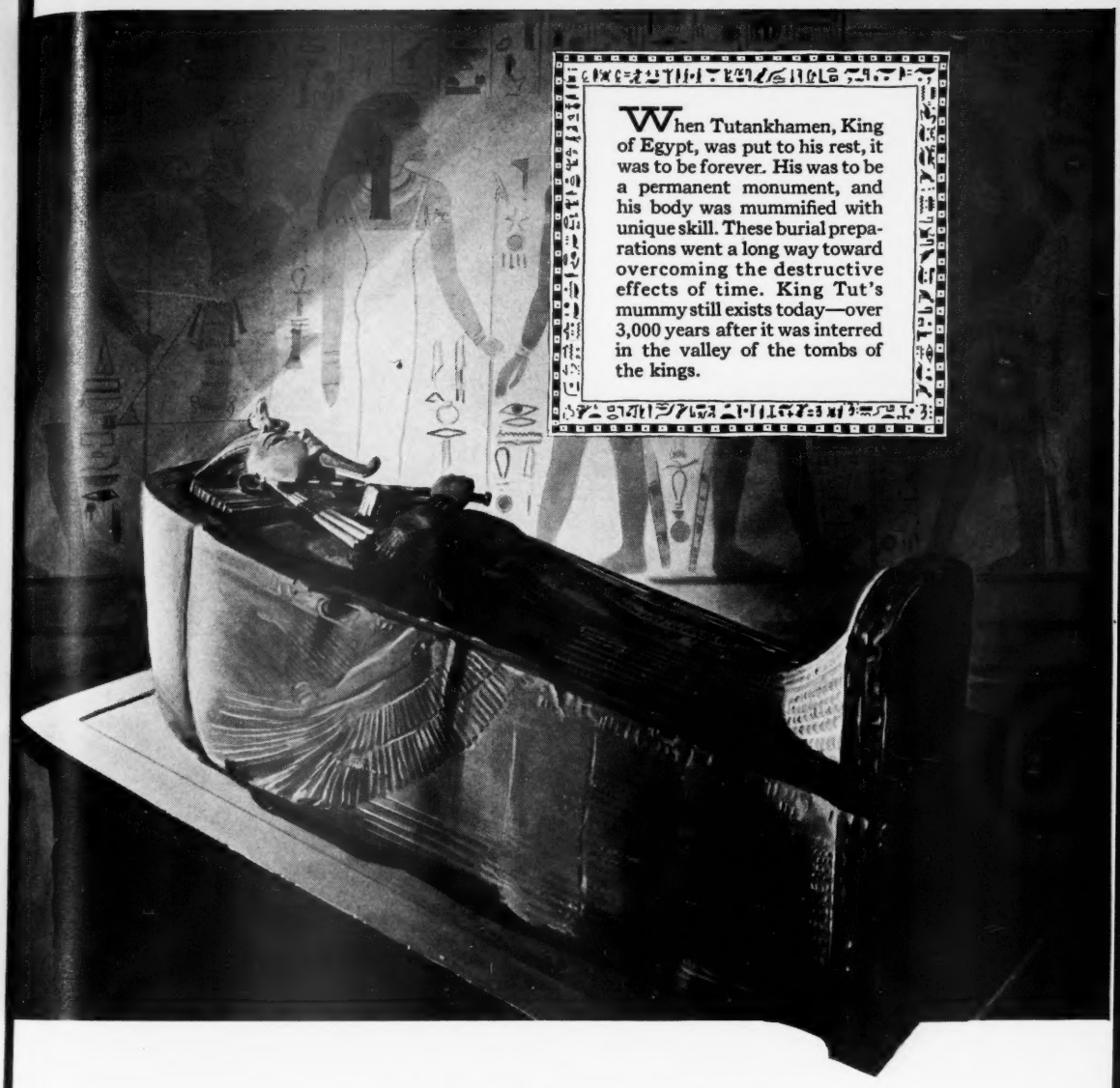
HAROLD KOONTZ

JANE ESHLEMAN CONANT

had this to say, among other things: "The advisory committee believes that the widespread competition that exists in the transportation industry today, properly harnessed to avoid unjust discriminations and unreasonable extremes, can be made to work for better and more efficient transportation for the consuming public." Secretary Weeks advocated giving the railroads greater freedom for competitive pricing.

DR. Dudley F. Pegrum, a professor of economics at the University of California in Los Angeles, testified that in his opinion "public policy today should place major reliance upon competition as the disciplinary force in the field of transport. The regulatory authorities should exercise their power over a particular agency without regard to the effect of such rates on the traffic of a rival agency, without regard to the regulation of such rates to the rates of any other agency, and without regard to whether the rates were lower than necessary to meet competition."

THE proposed legislation was not, of course, acted upon at the recent session of Congress. The subject is too intricate and requires too much detailed



When Tutankhamen, King of Egypt, was put to his rest, it was to be forever. His was to be a permanent monument, and his body was mummified with unique skill. These burial preparations went a long way toward overcoming the destructive effects of time. King Tut's mummy still exists today—over 3,000 years after it was interred in the valley of the tombs of the kings.

Especially Built For Burial

Like King Tutankhamen's mummy, many Kerite Cables are especially built for long-time burial. But these Kerite Cables do not enjoy the favorable dry, almost air-tight conditions of King Tut's tomb. These cables must withstand all the adverse conditions encountered in direct burial in the ground from the Arctic to the Tropics. Yet when these underground cables are unearthed, even after years of service, they are, unlike King Tut, very much alive. The name Kerite is recognized, the world over, as the hallmark of endurance.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

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study for that. But eventually the development may come.

THIS situation is due in large part to the nature of the competition which the railroads have been called on to meet in recent years. No one objects, or can properly object, to having to meet competition. But competition ought to be a two-way street, with equal opportunities for all competitors and equal obligations upon them. It ought not to be the one-way street, which, the railroads claim, is what we have in the field of transportation.

THE opening article in this issue deals with the problems of railroad management in coping with regulation. DR. HAROLD KOONTZ, the author, is professor of business policy and administration at the University of California in Los Angeles, and a well-known transportation economist. He was educated at Oberlin College (AB, '30), Northwestern (MBA, '31), and Yale (PhD, '35). He has had extensive teaching experience, serving with the faculties of Duke, Toledo, and Colgate universities before World War II. During the war period, he served as consultant to the old Office of Price Administration and chief of the traffic branch of the old War Production Board. He has written three books and scores of articles in technical, professional, and business journals on the subject of business management, especially transportation.

* * * *

SOME public utilities operating in areas where there has been an almost explosive upsurge in demand for service, due to the migration and growth of industry and population, have special problems. And these problems call for special engineering to enable such public utilities to take full advantage of local conditions which can be used to assist operations. In California the problem has always been water supply. JANE ESHLEMAN CONANT, of the editorial staff of the San Francisco *Call Bulletin,* has written, in the article beginning on page 231, an account of how Pacific Gas and Electric Company coped with some of the special problems requiring special answers in that service area of skyrocketing demands.

T. E. J. KEENA

* * * *

AMONG the nuclear reactor projects already licensed for development by business-managed public utility groups is the so-called Yankee atomic project, sponsored by 12 New England electric utilities. T. E. J. KEENA, of the editorial staff of *The Hartford Courant,* has looked into this project with a view of finding out more about it than has reached the press. He went to William Webster, president of the Yankee Atomic Electric Company, and he found out a number of interesting things. The resulting article, beginning on page 238, tells a thrilling story of planning and possibilities which the promoters of this New England project hope to realize in terms of practical electric utility supply and public service operations.

BORN in Hartford, Connecticut, MR. KEENA has served on the *Courant* in a number of capacities: reporter, desk man, and editorial writer since 1935. He took time out for an education at Yale University (BA, '41) and European service with the Army during World War II. He has also attended the University of Paris and Oxford University.

THE next number of this magazine will be out August 30th.

The Editors

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Get all the facts by reading booklet SC764 (New Sectional Customer Service Counter)... yours FREE upon request. Write to Remington Rand, Room 1849, 315 Fourth Ave., New York 10.

Remington Rand

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Coming IN THE NEXT ISSUE

(August 30, 1956, issue)

WHERE IS THE GIVEAWAY?

This is a study of tax contributions paid by certain commercial electric companies compared with dividends paid to owners and compared with operating payrolls. All taxes paid by representative southwestern electric companies amount to 200 per cent of cash dividends on common stock, and 150 per cent of operating payroll. The authors of this article, C. L. Cooke and Bennett L. Smith of the Community Public Service Company of Fort Worth, Texas, have made a thoughtful and careful analysis of the contributions made by electric utilities through their taxes in support of a central government which in turn supports publicly owned power operations. The authors conclude that government operation is the true giveaway of the national resources.

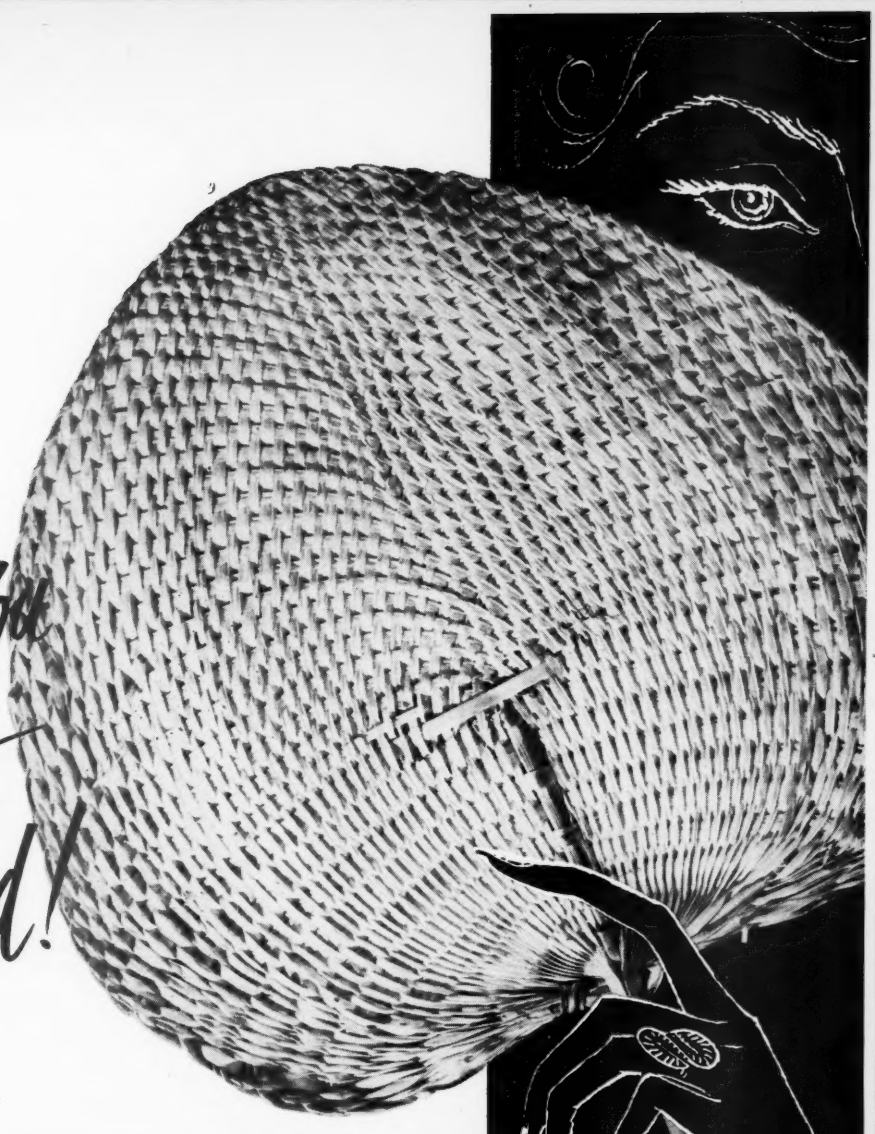
GOVERNMENT OR COMPANY NUCLEAR POWER DEVELOPMENT?

The recent 84th Congress killed, for the time being, a bill to direct the Atomic Energy Commission to proceed with the building and operation of nuclear power reactors—more popularly known as atomic power plants. But this adverse vote in the House of Representatives is not likely to be the end of the matter. The same question is certain to be raised in the 85th Congress. And there is a good deal of confusion over what is involved. Opponents say it is a movement to push the federal government into the newly developing atomic power business and discourage private enterprise therein. Proponents say it is nothing of the sort, but rather an effort to assist eventual commercial company participation by having the federal government absorb the expense and headaches of the uncertain pioneering stage. Ernest R. Abrams, well-known author of business and economic articles, has examined these arguments and gives us his conclusion of what the shooting is all about.

THE NATURAL GAS INDUSTRY AND OUR AMERICAN SOCIETY

The veto by President Eisenhower, earlier this year, of legislation to exempt independent natural gas producers from Federal Power Commission jurisdiction has by no means solved problems which that measure sought to remedy. Probably in different forms, similar bills will be strongly urged in the next session of Congress. But the immediate need would appear to be a finding of common ground by the producers, the pipelines, and the distributors. William Plunkett, Los Angeles analyst, has made a thoughtful appraisal of this situation. His article suggests a realistic approach to remedial legislation which will retain necessary controls in the public interest, while at the same time relieving independent producers from unnecessary burdens of impractical regulation.

Also . . . ***Special financial news, digests, and interpretations of court and commission decisions, general news happenings, reviews, Washington gossip, and other features of interest to public utility regulators, companies, executives, financial experts, employees, investors, and others.***



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Remarkable Remarks

"There never was in the world two opinions alike."
—MONTAIGNE

GEORGE WHITE
General Electric Company, atomic power development department.

"We are in this to make money and provide economical power."

E. C. WRAUSMAN
Vice president, St. Louis Car Company.

"It is of paramount importance that traffic planning include provisions for rapid transit, such as median strips in new roadways for the placement of tracks. . ."

EDITORIAL STATEMENT
Los Angeles Times.

"Just as truly as each of us has a stake in America, so, too, do we have a stake in Capitalism, for without Capitalism, America as we know it today would not exist."

WILLIAM S. HOLDEN
Idaho Falls attorney and reclamationist.

"I have been urging continued federal participation in the building of multipurpose dams. But the federal government should not try to override state laws dealing with water rights."

LORD WINSTER
London correspondent for The (Baltimore) Sun.

"There is a certain amount of rough truth in the saying that there are only two places where Socialism could be made to work: Heaven, where they do not need it, and Hell, where they have got it."

DONALD J. RUSSELL
President, Southern Pacific Company.

"The process of just letting the cream rise to the top is all too slow. Our country is critically short of competent industrial managers and we need to develop administrators as rapidly as we can."

WILLIAM T. FARICY
President, Association of American Railroads.

". . . it must be remembered that railroad transportation is organized transportation—disciplined transportation—carried on by trained forces, a characteristic of immense importance in meeting emergencies."

RAYMOND MOLEY
Columnist.

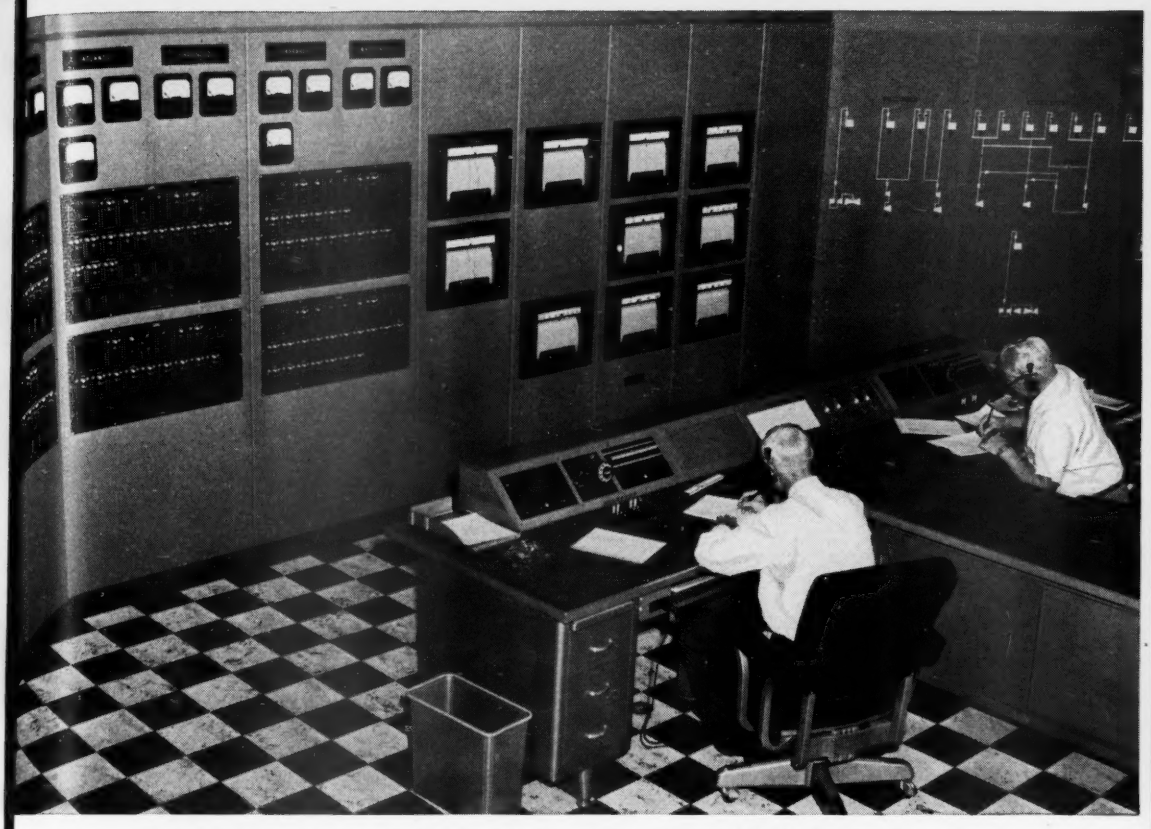
"The reason why government censorship should be avoided is not so much because a bureaucracy will tell you what not to do. The evil is that it will tell you what you shall do. What begins as a police regulation easily becomes a form of dictatorship."

K. N. MERRITT
Vice president, Railway Express Agency, Inc.

"Because you love freedom, you will be quick to recognize its enemies whenever and wherever they appear. Taxes that approach confiscatory levels are an instance. So is government competition with private enterprise. So are unnecessary and arbitrary controls by government."

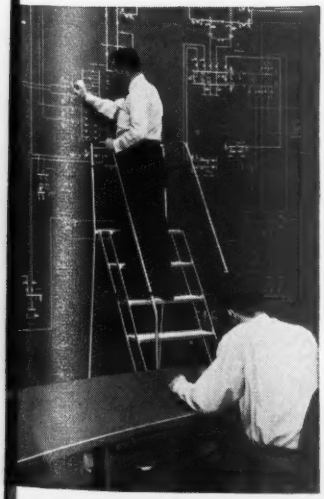
ROGER M. BLOUGH
Chairman of the board, United States Steel Corporation.

"It takes ever more dollars to cover ever-rising costs and prices if industry's full output is to be purchased. [Thus] the abuse of labor monopoly privilege and the monetary policy that transfers to the public in higher prices the penalty of that abuse appear to be the main elements of institutionalized inflation."



This new Systems Operations Center of the Jersey Central Power & Light Company keeps in touch with remote stations through Bell System channels for telemetering and remote control.

Bell System communications help Jersey Central regulate power transmission



olored pegs in wall diagram indicate gments of line to be isolated for main- nance work.

Channels for telemetering and remote control enable the Jersey Central Power & Light Company to regulate power transmission every step of the way from generator to home, store and factory.

An engineer glances at the dials, which give him a running picture of the system and the changing demands he has to meet—information which has been brought to him by Bell System telemetering channels.

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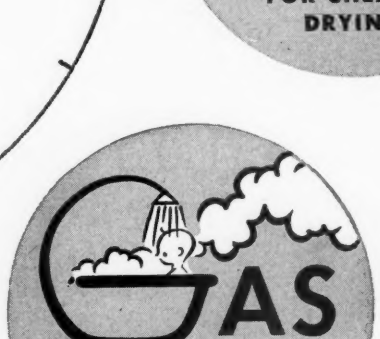

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Power-Dome more than a name

. . . proves real gas saver, reduces upkeep, too . . .

How Chrysler Engineering Cuts Truck Operating Costs

by Jim Byers

When a new truck engine that promises more MPG and lower upkeep comes along, that's *news.*

But, naturally enough, fleet operators prefer not to go overboard in their praise of such new developments until they've proved them in actual operation.

That's the story of Chrysler Corporation's radically different Power-Dome V-8 combustion chamber, introduced in the 1954 Dodge C-1 series.

From the start, fleet men were agreed it looked great "on paper", but had to wait for a *factual* answer to the all-important question, "Will Power-Dome actually increase gas mileage, actually reduce maintenance costs?"

The answer to that question, after well over two years of service in fleets of all types the country over, seems to be an unqualified "Yes".

Owners of Series C-1, and the current C-3 Dodge V-8 trucks report remarkable gas savings and unusually low maintenance costs. They say they not only get more MPG (on regular fuel), but find engines maintain power and efficiency far longer than those of standard design.

In layman's language, here is how Chrysler engineers were able to give Dodge short-stroke V-8's these cost-cutting characteristics:

First, let's study the diagram below.

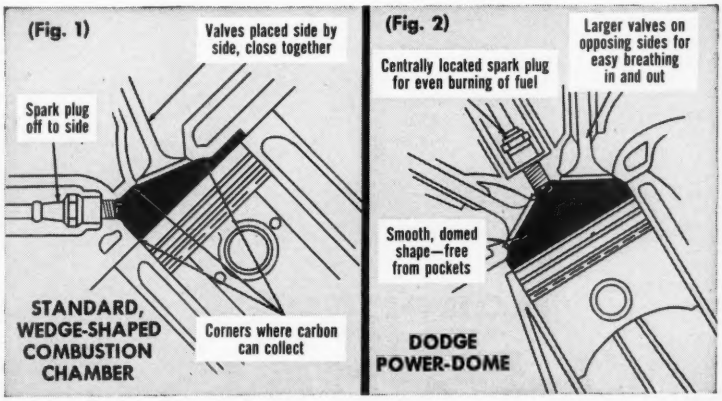
You'll notice, among other things, that the standard, wedge-shaped combustion chamber (Fig. 1) has corners where carbon can easily collect, whereas the Dodge Power-Dome chamber (Fig. 2) eliminates such power-stealing carbon hot spots.

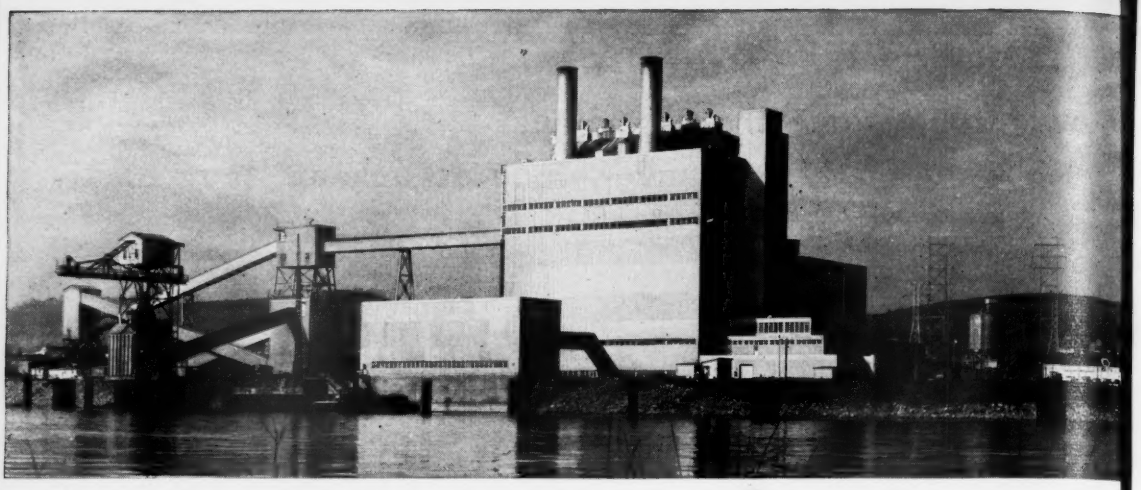
Next, notice the spark-plug location. In the Power-Dome design, it is centrally located, instead of off to one side. Flame travel, therefore, is uniform to all parts of the chamber; thus the fuel mixture is burned faster, more evenly, and more completely.

Valve placement, too, is unusual. In the Dodge Chrysler-engineered power plant, intake and exhaust valves are located on opposing sides. This permits use of larger valves for easier engine breathing, elimination of fuel waste.

In addition to Power-Dome, Chrysler engineers have incorporated other features in Dodge truck engines that contribute to their unusual operating economy. Among a number of such advancements not found in most competitive makes are floating oil intake, ceramic fuel filter, positive exhaust valve rotators and dual exhaust system as standard equipment.

In fact, Chrysler engineers have made "fleet economy" their theme throughout the designing of today's Dodge Job-Rated Trucks. The result is a full line of trucks any cost-conscious fleet operator would be wise to investigate before investing in a replacement or adding to his fleet.





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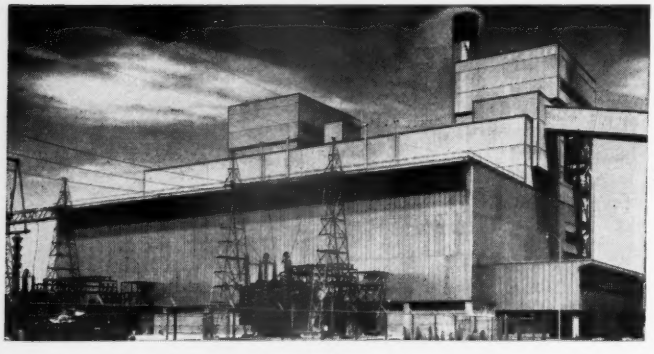

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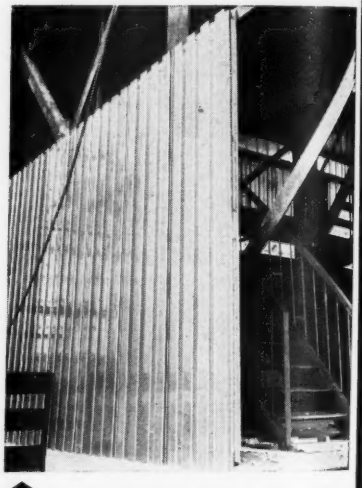
Q-Panel walls grace the new Elrama Po Plant (above) near Pittsburgh. It was desig by Duquesne Light Company's Engineer and Construction Department. The Dr Corporation was General Contractor.



Q-Panel walls (above) go up quickly in any weather because they are dry and hung in place, not piled up.

More than 32,000 sq. ft. of Q-Panels were us to enclose the impressive Hawthorn Ste Electric Station (left) of the Kansas City, M souri, Power and Light Company. Ebasco Se vices, Inc., designed and built the plant.

Please send a free copy of your Q-Panel Catalog.

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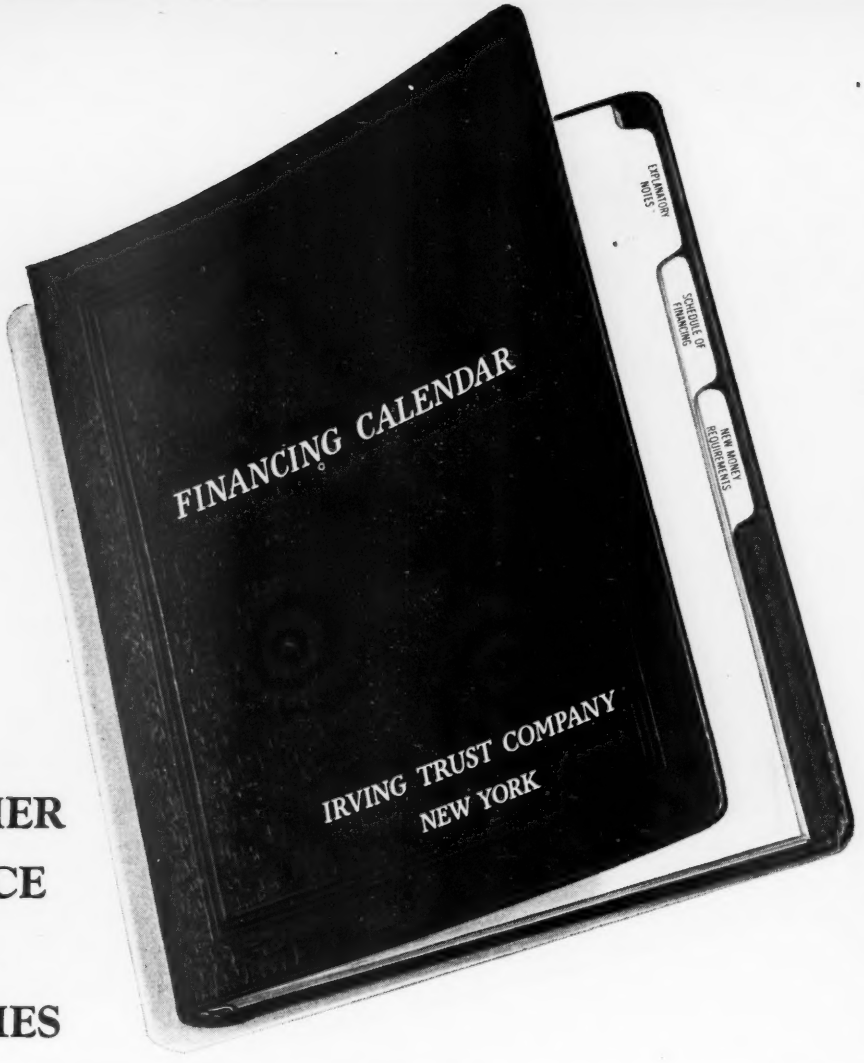

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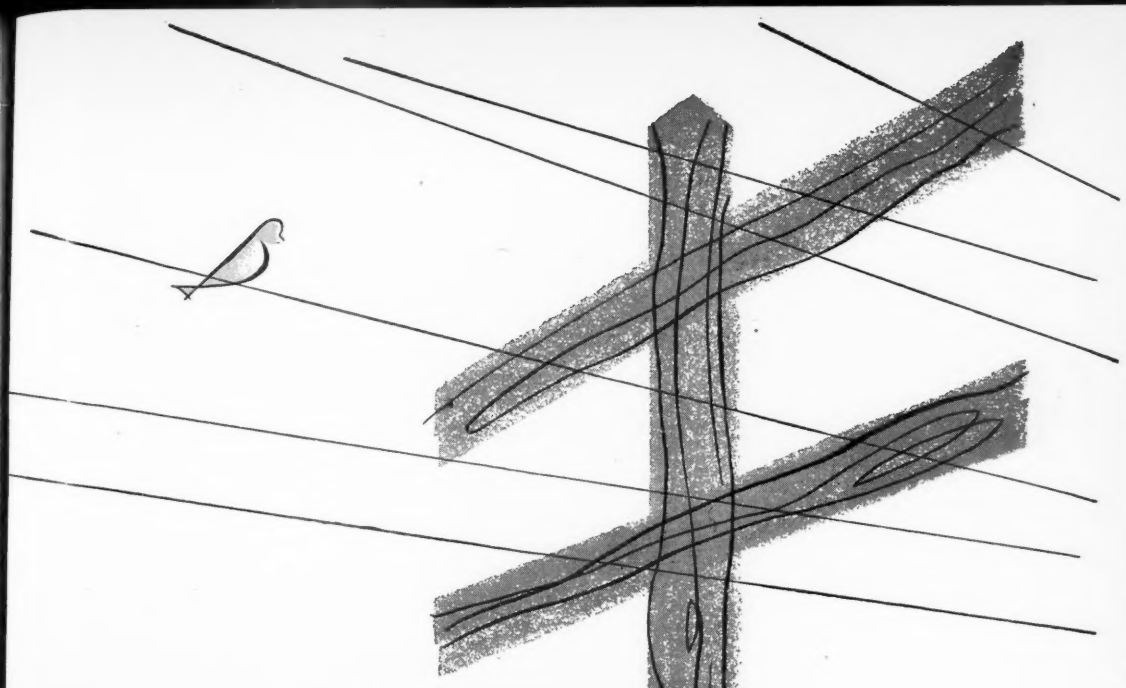

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Q. Are all modern-day wood preservatives about equal in value?

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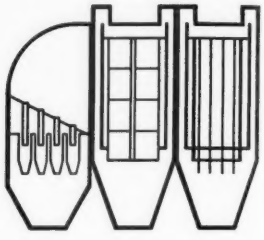

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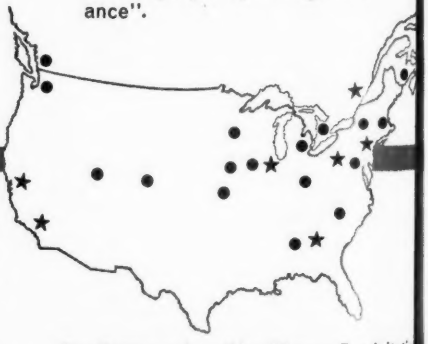

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Thursday—16 *Michigan Independent Telephone Association will hold annual meeting, Grand Rapids, Mich. Sept. 6, 7.* ***Advance notice.***	**Friday—17** *West Virginia Broadcasters Association begins summer meeting, White Sulphur Springs, W. Va.*	**Saturday—18** *New Jersey Gas Association will hold annual meeting, Spring Lake, N. J. Sept. 7.* ***Advance notice.***	**Sunday—19** *Independent Natural Gas Association will hold annual membership meeting, San Antonio, Tex. Sept. 9-11.* ***Advance notice.***
Monday—20 *American Society of Mechanical Engineers will hold fall meeting, Denver, Colo. Sept. 10-12.* ***Advance notice.***	**Tuesday—21** *Western Electric Show and Convention begin, Los Angeles, Cal.*	**Wednesday—22** *New England Gas Association will hold safety conference, Boston, Mass. Sept 11.* ***Advance notice.***	**Thursday—23** *Pacific Coast Gas Association will hold annual meeting, Coronado, Cal. Sept. 11-13.* ***Advance notice.***
Friday—24 *Southern Gas Association begins distribution operations and maintenance round - table conference, Little Rock, Ark.*	**Saturday—25** *Northwest Public Power Association, Inc., Accounting Section, will hold meeting, Wenatchee, Wash. Sept. 11-14.* ***Advance notice.***	**Sunday—26** *Public Utilities Association of the Virginias will hold annual meeting, White Sulphur Springs, W. Va. Sept. 14, 15.* ***Advance notice.***	**Monday—27** *American Bar Association begins annual meeting, Dallas, Tex.*
Tuesday—28 *American Transit Association will hold annual meeting, St. Louis, Mo. Sept. 17-19.* ***Advance notice.***	**Wednesday—29** *Annual Appalachian Gas Measurement Short Course ends, Morgantown, W. Va.*	**Thursday—30** *American Water Works Association, Kentucky-Tennessee Section, will hold annual meeting, Chattanooga, Tenn. Sept. 17-19.* ***Advance notice.***	**Friday—31** *Atomic Industrial Forum, Inc., will hold annual forum conference and trade fair, Chicago, Ill. Sept. 24-28.* ***Advance notice.***

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Public Utilities
FORTNIGHTLY

VOL. 58, NO. 4 AUGUST 16, 1956

Competition between Regulated And Unregulated Transport

It is not the fact of competition but rather the one-sided nature of it which has placed the railroads at a serious economic disadvantage. It is the result of an unequal contest between regulated railroads and unregulated competition.

BY HAROLD KOONTZ*

THE problem of competition between regulated and unregulated forms of transportation and the issues involved must be considered in the light of the current and forecast status of the American economy. The American economy has entered an era characterized by full employment and sound growth. While one cannot help but be wary of the kind of optimism reminiscent of the "new high plateau" feeling of 1928, there do appear to be reasons for having confidence in the extremely favorable projections of future national product.

Among these reasons are the increased know-how of government action for stability and growth, the power of the government in fiscal and monetary matters, and the temper of an electorate who will unquestionably expect and demand a full employment economy. With the assump-

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tions of full employment, continued increases in productivity, and probable population increases, it is entirely conservative to expect a doubling of the national economy, in terms of gross national product of current dollars, in the next two decades. Since the volume of intercity transportation—both freight and passenger—has historically borne an extremely close relationship to gross national product, there is every reason to believe that the total market for transportation will virtually double in the next two decades.

WHILE an expanding economy offers opportunities to business operators it also tends to bring with it an aggressive kind of competition. Such expansion as is now foreseen shows signs of being accompanied by improved technology, lower costs, and better products and services; and these spell competition with a tendency for the fittest to survive. Moreover, in the period ahead, there is reason to believe that improvements in technology will be so widely shared that the real competitive edge will go to those companies characterized by an intelligent, hard-hitting, forward-looking, and agile management which can readily take advantage of the opportunities offered.

It is hardly any wonder, then, that recent studies of national transportation regulation and promotion have focused attention on the problem of competition in transportation and its implications for government policy. The once well-founded fears of railroad monopoly have been dispelled by the growing competition between railroads and the even sharper competition between the various types of carriers—rail, highway, water, air, and pipeline. The fears bred by the depressed thirties that competition was an evil which should be suppressed by government action in the interest of stability have given way to widespread public support of vigorous competition.

This new philosophy as applied to transportation has been most recently expressed in the report of the Presidential Advisory Committee on Transport Policy and Organization, issued in April, 1955. In recommending a freer program of regulation and greater reliance on competition, the report recognizes a given fact, that the transportation industry, although in large part regulated as though it were a monopoly, is essentially competitive. The report also serves as an official recognition of the extent of this competition, particularly the competition between the regulated and the unregulated segments of the transportation industry.

Regulated and Unregulated Forms of Transportation

IT is neither simple nor accurate arbitrarily to classify some forms of transportation as regulated and others as unregulated. As can be easily understood, all kinds of business activity are subject to some kind or degree of regulation. But in the field of transportation, a distinction is drawn between normal regulation of the kind which any business may expect and that which constitutes an abnormal interference with managerial discretion.

The Concept of Regulated Transportation. The distinction between the regulated and the unregulated business lies in the lack of freedom which the former has in the economic incidents of managership. In the transportation field, the regulated company, unlike the unregulated firm, may not enter or withdraw from markets, may

not price its output without government approval, must meet special and often specific standards of price and service discrimination, and is subject to strict control over the nature, quality, and extension of service. Moreover, in order to make price and service control effective, regulation has normally been extended to such other areas as accounts and statistics, issuance of securities and nature of financial structure, and the filing of tariffs. However, the establishment of statutory regulation does not necessarily mean real regulation. If, due to limitations of administrative interest, knowledge, facilities, or personnel, a statutory program of regulation of a form of transportation is not transformed into action, the form can hardly be regarded as regulated. As will be noted presently, this consideration is of some importance in analyzing competition between the regulated and unregulated forms of transportation.

REGULATED *Forms of Transportation.* Under the standards established above, it appears clearly that the railroads, the certificated airlines, most motor common carriers, and certain water common carriers fall in the category of regulated forms of transportation. Most intercity carriers operating in intrastate commerce also do so although regulation by the various states is often spotty in practice. With the exception of certain carriers who are exempt from the Interstate Commerce Act, intercity motor common carriers operating in interstate commerce fall into the regulated group. While there are several kinds of common carriers exempt from the provisions of the Interstate Commerce Act, by far the most important are

INTERCITY FREIGHT TRAFFIC CARRIED BY REGULATED AND UNREGULATED FORMS (1953)

Billions of Ton Miles

Forms of Transport	*Total Intercity Traffic*	*Traffic by Regulated Forms*	*Traffic by Partially Regulated Forms*	*Traffic By Unregulated Forms*
Railroads	614.2	614.2	—	—
Motor Carriers	206.8	84.5*	8.6†	113.7
Pipelines	165.7	—	165.7	—
Inland Waterways (Including Great Lakes)	202.5	40.5§	—	162.0§
Intercoastal and Coastwise Water Carriers	270.0	40.5‡	—	229.5
Airlines	0.4	0.4	—	—
Total	1,459.6	780.1	174.3	505.2
Per Cent to Total	100.0	53.5	11.9	34.6
Total Excluding Intercoastal and Coastwise	1,189.6	739.6	174.3	275.7
Per Cent to Total	100.0	62.2	14.7	23.1

Source: *68th Annual Report, ICC* (1954), p. 30, for all except intercoastal and coastwise traffic which was estimated from data on tonnage and haul from reports of the Federal Maritime Board and U. S. Army, Chief of Engineers.

*Estimated by author. †Estimated on basis of percentage of total for-hire traffic carried by contract carriers reporting to ICC. §Based on an estimate of 20 per cent of traffic carried by regulated carriers. ‡Based on an estimate of 15 per cent of traffic carried by regulated carriers.

those engaged in the transportation of agricultural commodities (but not including products manufactured from them), livestock, and fish.[1] Those water carriers operating intercity within the United States which are not exempted from regulation are fairly completely controlled; but exempt from regulation are those carriers which handle commodities in bulk (with the cargo space not utilized for more than three such commodities) and these exempt carriers handle most of the intercity common carrier water traffic.

PARTIALLY *Regulated Forms of Transportation.* For purposes of clarifying the competitive issues in transportation, it appears to be useful to recognize that a certain portion of transportation might be characterized as partially regulated. Operations in this category are either (1) subjected to limited statutory regulation or (2) a broad statutory basis of regulation has not, in fact, been assiduously applied by the responsible administrative agency. In the former category are the intercity contract motor and water carriers and the water carriers operating between a port in the continental United States and a port in one of the territories or in a foreign country. In the latter category are the oil pipelines. Although the Interstate Commerce Commission has had ample statutory authority over these carriers since 1906 and approximately half the states regulate them as common carriers, the actual amount of regulation has been small indeed. To be sure, the law attempted to make a kind of carrier common which was, to a major extent, private in nature, and shipper complaints have been so few as not to make more effective regulation seem necessary.

The Unregulated Forms of Transportation. The remaining forms of transportation fall in the category of the unregulated. These include the private motor carrier—both the truck and the passenger car—the private water carrier, the contract and private air carrier, the exempt for-hire motor carriers—especially those in the hauling of agricultural products, livestock, and fish—and the for-hire bulk water carriers.

Some Issues in Competition between Regulated and Unregulated Forms

ASIDE from the pure economics of the extent and nature of competition between regulated and unregulated forms of transportation there are a number of important issues which arise. These have a significant bearing on the public policies involved.

Interference with Effective Management. The more competitive an industry is the more important alert and effective management becomes. One of the major difficulties with economic regulation is that it interferes seriously with management. This is most clearly indicated in the problems of meeting competition with the shackles of monopoly-type regulation. Another area of interference is the preoccupation with government controls which regulation forces on a carrier manager. The limits placed on price policies which keep regulated companies from meeting traffic demands and competition, the cum-

[1]Other exemptions include vehicles used exclusively in the distribution of newspapers, vehicles used in transportation of property incidental to air transport, vehicles used in transportation of property wholly within a municipality or zone adjacent to or commercially a part of such a municipality, and vehicles used in casual, occasional, or reciprocal transportation by persons not engaged in such motor transport as a regular business.

New Accent on Transport Regulation

"THE present public interest in transportation regulation seems to be influenced not only by past experience of abuses in transportation but also by the new economic philosophy of the post World War II full employment economy. It seems to lie primarily in obtaining economic stability and growth, stability through fair and responsible rates and service, and growth through making sure that the industry will be dominated by competitive alertness. One would not deny that the public interest in transportation is greater than that in most other businesses, but the opinion seems to be growing that the way to protect this public interest is to maintain the same kind of fair, but aggressive, competition as exists in such industries as steel, aluminum, automobile manufacturing, and electronics."

bersome machinery for changing prices, the detailed interferences with accounting and financial procedures, and the complicated legalistic approach to various other decision areas are some of the other features of regulation which require so much of the energy and attention of carrier managers that they often have little time or inclination to undertake effectively the more important job of running their companies. Observation of many railroad companies which have long been under the yoke of regulation sometimes leads one to the cynical conclusion that certain of these companies are run for the purpose of meeting regulations and not to produce the best kind of service at the lowest cost. Problems brought on by change—problems with which every enterprise must cope if it is to maintain its successful existence—cannot be met quickly in a regulated business. And delays in reaching decisions are inherent in the regulatory process where the requirements of doing business make it necessary that all concerned with the matter be heard.

THESE obstacles to effective management are not without their cost. There is perhaps more than an accidental corre-

lation between the traditionally low earnings and economic problems of regulated industries and the fact of regulation. The railroads, the common motor carriers, and the common water carriers have operated, in general, on rather low margins of profit and their net earnings have proved to be sensitive to business changes. This situation has traditionally been blamed upon the tendency toward overcapacity and vigorous competition in the transportation field. It is suggested, however, that this economic problem is due instead to the slow-moving managerial process which detailed regulation seems to engender.

Practical Difficulties of Equalized Regulation. For at least two decades public policy has appeared to be aimed toward solving the problem of regulated and unregulated carriers by placing equal controls on all forms of transportation. Certainly the inequality of regulation between the railroads and motor carriers played a major part in the passage of the Motor Carrier Act of 1935. It was a dominant consideration in bringing broader water carrier regulation with the approval of the Transportation Act of 1940. Although the attempt to equalize regulation by placing controls on unregulated forms has received less public attention in the past few years than for many years prior, and even though there are indications that public policy might better equalize regulation by removing certain controls over the railroads, it appears obvious that true equalization of regulation is a practical impossibility.

IN the first place it would certainly be politically unthinkable to outlaw the motor private carrier. There is even some doubt that the commodities clause of the Hepburn Act could be applied to forms of transportation other than the railroads. There would, furthermore, be no useful purpose served in attempting to regulate the rates or services of private carriers since it is the cost to the operating company which is important rather than any rate which might be established. Moreover, there seems to be no reasonable probability of interfering with the long-established exemption of agricultural motor carriers in view of the farm vote and the many informal relationships which hauling of agricultural products requires. It would probably be practically and administratively feasible to bring bulk water carriers under regulation, but, since the private carrier in this field is so important and since water rates are so low where bulk transportation is employed, the effect on competition between regulated and unregulated forms would be negligible.

To be realistic also, regulation can probably not be equalized because of the sheer administrative task involved. In addition to the approximately one thousand railroads, pipelines, and water carriers for which the Interstate Commerce Commission is responsible, there are some 20,000 for-hire motor carriers and at least 134,000 exempt and private carriers subject to a greater or lesser degree to its jurisdiction. Although only a small portion of the motor carriers are subject to economic regulations and despite the fact that motor carrier safety regulations would appear to present a relatively simple administrative task, the commission has noted repeatedly that it has not been able to control this industry effectively. For example, in 1954 the commission estimated that there were more than 100,000 exempt and

private carriers who had never even been notified officially that they were subject to its safety regulations.[2] Even in the common carrier area the commission has made the startling admission that it does not have information available as to what carriers, or how many, have been authorized to transport commodities between any two points or within any territory.[3]

THESE administrative deficiencies in regulation could be duplicated in many other instances with the Interstate Commerce Commission, with the Civil Aeronautics Board, the Federal Maritime Board, and the various state commissions. Most commissions are notoriously understaffed for the job they have to do and legislatures show little interest in increasing appropriations. Improved management of the commissions, in which there have been noteworthy advances in the past few years, cannot cope with this problem. Moreover, in the unlikely event that legislatures would grant regulatory commissions liberal increases in staff and facilities, the administrative task itself seems to be so vast as to give little hope that it could be accomplished.

Public Welfare and Transportation Capacity. One of the disquieting features of the transportation industry is that the public welfare seems to demand excess capacity. The requirements of capacity for national defense were dramatically demonstrated during World War II when, fortunately, the railroads of the nation had unutilized capacity which was turned to important national purposes. The war also forced the construction of new pipelines which necessarily have added to the postwar transportation capacity.

But aside from pure defense considerations, the needs of social welfare in normal times tend to force excess transport capacity. Transportation companies are ex-

[2] *67th Annual Report,* ICC (1953), p. 59.
[3] *68th Annual Report,* ICC (1954), p. 105.

GROWTH OF INTERCITY MOTOR CARRIER TRAFFIC, 1939-53

	Billions of Ton Miles				*Ton Miles of Carriers Reporting To ICC As Per Cent of Total*		
	Intercity Ton Miles of Carriers Reporting to ICC			*Total Intercity Ton Miles*			
	Common	*Contract*	*Total*		*Common*	*Contract*	*Total*
1939	14.9	4.7	19.6	52.8	28	9	37
1940	17.4	3.3	20.7	62.0	28	5	33
1941	23.2	3.6	26.8	81.2	29	4	33
1942	25.4	2.7	28.1	59.9	42	5	47
1943	26.3	2.5	28.8	56.5	47	4	51
1944	24.6	2.7	27.3	58.0	42	5	47
1945	24.8	2.5	27.3	66.6	37	4	41
1946	28.2	2.2	30.4	81.7	34	3	37
1947	34.7	3.0	37.7	101.7	34	3	37
1948	42.6	4.1	46.7	115.5	36	4	40
1949	43.9	4.0	47.9	124.9	35	3	38
1950	61.3	4.4	65.7	170.2	36	3	39
1951	66.9	5.4	72.3	182.5	37	3	40
1952	64.1	6.7	70.8	184.1	35	3	38
1953	65.1	7.9	73.0	206.8	31	4	35

Source: ICC *Monthly Comment on Transportation Statistics,* November 10, 1954, p. 14; ICC, Statement No. 531, January, 1953, and No. 544, March, 1954; and *68th Annual Report,* ICC (1954), p. 30.

pected to be geared for peak loads. Far more significant, however, in terms of transportation capacity, is the understandable pressure to build adequate highways for public use. While the national highway construction program is certainly far behind present public demand, many programs are under way, including a major federal government program, to increase this capacity. Since the standard of highway construction which will satisfy the private passenger car user carries with it excess capacity from the standpoint of motor freight use, and since highways, once built, may as well be used, there is likely to develop a great deal more capacity for highway freight transportation.

ECONOMIC *Pressures in Competition of Regulated and Unregulated Forms.* In addition to the problem of capacity and its importance for public welfare, a problem which has seemed to have been obscured by the postwar expansion, there are various other economic pressures involved in competition of regulated and unregulated forms. While no attempt can be made here to deal with them all, a few major problems may be pointed out as examples.

Trip leasing of motor vehicles, the control of which has claimed so much of the Interstate Commerce Commission's attention in recent years, arises from overcapacity. There has, of course, been a sizable increase in the volume of transportation performed by shippers with equipment which they lease from vehicle owners. Even though the Interstate Commerce Commission may be successful in effectuating its curbs on trip leasing, and this is doubtful in view of the heavy pressures brought to bear in Congress, there will ever be a strong drive to evade any such regulations. Empty return haul capacity does represent an economic waste and furnishes an opportunity for profit. With the many thousands of private and for-hire truckers operating several million trucks in intercity operations, it is doubted that regulatory and administrative processes can be alert and thorough enough to stop the use of this capacity. Moreover, there is a real question as to whether all trip leasing *should* be outlawed in view of the waste in transportation involved.

A SECOND economic pressure which will also continue to cause regulatory difficulties is the contract carrier. The regulatory requirements for contract carriage are not severe and this partially regulated form of transportation is likely to continue as a competitive threat to the regulated forms.

Another interesting economic pressure arises from traditional tax structures. It has long been customary for the states to tax for-hire carriers at higher rates than private carriers, partly on the curious notion that for-hire carriers, being in the business of transportation for profit rather than in some other business, should pay more for the use of public facilities. It has likewise been customary for most states to tax common carriers at higher rates than contract carriers. The result of this tax discrimination, as well as differences in effective regulation, has tended to place the common carrier under certain economic disadvantages in its competition with private transportation. While the force of this economic pressure could be eliminated with a more enlightened tax policy, one despairs of accomplishing this in view of the 48 different state jurisdictions operating in this field.

When Regulation Is Lifted

"REMOVED from the protective umbrella of regulation, freed from the rigidities of government regulation, thrust more openly into the rivalries of the market place, and confronted with the challenge of a rapidly expanding economy, the now regulated companies will be forced to re-examine their managerial needs and resources. Policies and programs will have to be market oriented rather than government oriented. Experiment in rates and services will have to replace the forum of the regulatory commission. Increased emphasis on the quality of management—from foreman to president—will be required. Attention to business strategies will supplant preoccupation with legal strategies."

The Alternatives for Public Policy

THE present situation of competition between unregulated and regulated forms of transportation and the public interest in assuring that public policy will not be the cause for any weakening of the nation's transportation system have led to considerable analysis of transport regulation. Several investigations and reports have been made by congressional and Cabinet agencies and the regulatory commissions themselves have recognized that this problem is one which requires careful review and probable revision.

Before arriving at some determination of public policy, it is naturally wise to consider the major alternatives. They seem to this writer to be four: (1) continuance of present unequal regulation; (2) thorough regulation; (3) free responsible competition; and (4) limited regulation.

Continuance of Present Unequal Regulation. In searching for alternatives one should not overlook the possibility of continuing the present program of unequal regulation with slight modifications from time to time as urgent problems require.

The continuance of the present policy would be a recognition that, under it, the American economy has developed perhaps the best, the most efficient, and most flexible transportation system in the world. It has served the needs of the economy in both peace and war. Despite many prophecies of doom, most railroads are in sound financial condition, have good earnings, and have been able to obtain capital needed for expansion. Although motor common carriers have been relatively less profitable and 58 of the 165 reporting class I intercity passenger carriers had a net operating loss in 1953,[4] the economic condition of the motor carrier industry cannot be regarded as critical. These carriers have long operated on narrow profit margins and, despite this, have been able to expand their facilities and services.

ONE of the principal reasons for not accepting as a desirable alternative continuance of the present system of regulation is that it may not be assuring continuation of a good transportation system. Economic environments have ways of changing and social and political institutions should be flexible enough to meet these changes. Moreover, it is doubtful whether public interest in stable and growing transportation will be served by continuance of the present policy.

Thorough Regulation. Another obvious alternative is to equalize transportation regulation by placing all types of transportation under the same thorough economic controls which have long been applied to the railroads. While this alternative is not impossible, it is probably impractical. Thorough regulation would necessarily imply equal regulation virtually at the level of present railroad regulation. As pointed out earlier, equal regulation is politically and administratively impracticable. Moreover, some competition between regulated and unregulated forms is in the field of intrastate commerce and uniform state control is not reasonable to expect. Even though the federal government, under the liberal interpretation of interstate commerce of recent years, could doubtless force uniform regulation on most intrastate traffic, this likewise seems politically impracticable.

Furthermore, there is much to be said for the view that thorough regulation, particularly that kind unified through control by a single commission, has a built-in tendency toward transportation monopoly.[5] The regulatory commission responsible for regulation will naturally tend to protect certified carriers against new competition since one of the implications of control of entry is to stabilize the industry. Likewise, there is ever the danger that the commission will have its thinking colored by the dominant transportation agency under its control.

LESSENING of competition also tends to result from the very inflexibility of regulation. It is readily apparent in the case of control of entry into service but it also has an important influence through regulation of rates which necessarily tend to be the same and to be slow to change. Other features of regulation, such as se-

[4] *68th Annual Report,* ICC (1954) p. 14.

[5] For an interesting view along this line see Dudley F. Pegrum, "The Economic Basis of Public Policy for Motor Transport," *Land Economics,* Vol. 28 (August, 1952), pp. 244-63. See also the excellent article by James C. Nelson, "Patterns of Competition and Monopoly in Present-day Transport and Implications for Public Policy," *Land Economics,* Vol. 26 (August, 1950), p. 232-48.

curities and accounting control, tend to bring about a kind of inflexible uniformity which makes vigorous competition difficult.

FREE *Responsible Competition.* One of the very real alternatives for public policy is to free the entire transportation industry from most of its present framework of regulation. This alernative is based upon the demonstrated fact that the industry is now competitive and that in most other major competitive industries the economic elements of managerial decision making are not controlled. In other words, the typical manufacturing plant need receive no certificate of convenience and necessity for entry into or abandonment of a market, need get no approval for its price changes from a government agency, can develop its own chart of accounts within the broad limitations of internal revenue regulations and the securities laws, and may finance its business generally free of detailed government control. Essentiality is no persuasive argument for distinguishing transportation from many other industries since this kind of competitive freedom is available to such vital industries as steel, aluminum, and petroleum.

IN giving the transportation industry the same kind of competitive freedom as that enjoyed by the extractive, manufacturing, and service industries, it is not necessary that the freedom be irresponsible. One of the areas where transportation users are particularly concerned is price discrimination. But so-called private industry is not free in this regard. The Clayton and Robinson-Patman acts clearly limit discriminatory pricing in industry in general. If the Robinson-Patman Act were modified so that one of the key tests of unlawful action is injury to competition rather than injury to competitors, there would seem to be a reasonable basis for using this law to restrict powerful transportation companies which might engage in predatory pricing to destroy competition or pricing damaging to the small shipper.

In addition to controls of this kind, a policy of responsible competition could well include minimum standards of service and requirements of financial responsibility in much the same way that other businesses serving the public are required to meet standards deemed minimum for the public health, safety, or welfare. With these limited types of control the way

INTERCITY PASSENGER TRAFFIC CARRIED BY REGULATED AND UNREGULATED FORMS
(1953)

Billions of Passenger Miles

Forms of Transport	*Total Intercity Traffic*	*Traffic by Regulated Forms*	*Traffic by Unregulated Forms*
Railroads	32.3	32.3	—
Motor Buses	29.8	29.8	—
Inland Waterways	1.5	1.5	—
Airlines	17.4	17.4	—
Private Automobiles	501.2	—	501.2
Total	582.2	81.0	501.2
Per Cent of Total	100.0	13.9	86.1

Source: *68th Annual Report,* ICC (1954), p. 30.

would be open in all quarters for effective competition and carrier success would depend upon the alertness and ability of management.

Except for the tradition of regulation and the probability that the public might not accept a program of free responsible competition, there would seem to be so few dangers in this program as to justify its serious consideration. Vigorous prosecution against monopolistic practices plus the competitive impetus already existing in the transportation industry shows a high degree of promise of protecting the public interest. The position often taken that the larger railroads would swallow the smaller trucking companies, the airlines, and the water carriers, or that the railroads would be able to drive their smaller competitors out of business, does not seem to be supported by the facts.

ASSUMING that predatory and monopolistic practices would be outlawed as they are now by business in general, there is no more reason to expect this to happen than to have expected it to happen in the past. Some railroad companies have operated motor carrier lines under grandfather rights and others have continued to operate water lines. There is no evidence that the superior financial power of the railroads has crippled their highway or water competitors. Indeed, one should not forget that the early development of the motor carrier industry itself took place in the days when the railroads could enter the business without restriction.

Limited Regulation. As a compromise between continuance of the present program of regulation and a program of free responsible competition, it is possible to adopt a system of limited regulation. Such a program would recognize the competitive situation in the transportation industry while holding a special, though limited, kind of government control to assure responsibility of common carriers. This alternative for public policy should be based upon the objective of allowing regulated carriers to compete effectively with unregulated or partially unregulated carriers, while at the same time protecting the shipping public against the dangers believed to exist in free competition.

Differences of opinion will exist as to probable regulatory changes in a program of limited control of common carriers, but there are certain principles which should be generally agreed upon. One is that regulated carriers should be allowed sufficient managerial discretion to meet important competition of the unregulated carriers. Another is that common carriers should not be required, in the absence of clearly demonstrated and fairly urgent public need, to carry on operations which are unprofitable and these should normally be subsidized by the government.

IN addition, contract carriers should be carefully scrutinized. Those which are essentially public in nature should be classified as common carriers and only those which represent a limited contract operation similar to that found in the private carrier division of a company should be continued on a contract carrier status. In order to make this more effective, more publicity of contract carrier contract arrangements and rates should be required. With a clarification of the regulatory program there should, of course, come a broadening of it to cover all kinds of common carrier in every form of transportation. Preferably, exemptions and excep-

The Burden of Transport Regulation

"ONE of the major difficulties with economic regulation is that it interferes seriously with management. . . . Another area of interference is the preoccupation with government controls which regulation forces on a carrier manager. The limits placed on price policies which keep regulated companies from meeting traffic demands and competition, the cumbersome machinery for changing prices, the detailed interferences with accounting and financial procedures, and the complicated legalistic approach to various other decision areas are some of the other features of regulation which require so much of the energy and attention of carrier managers that they often have little time or inclination to undertake effectively the more important job of running their companies."

tions should not be made at all, although little danger would follow if those made could be justified on the basis of inconsequential competition with regulated carriers.

COMMON carrier rates might be continued under relaxed controls which would allow easier price shifts to meet competition. The kind of maximum-minimum rate control recommended by the Presidential Advisory Committee on Transport Policy and Organization would seem to be appropriate. It will be recalled that, in general, this recommendation proposed minimum rates at a level of directly ascertainable costs and maximum rates on the more vague standard of unreasonableness. Rate discrimination might likewise be tied to costs in much the same manner as is employed in the Robinson-Patman Act. If the commission were denied the right to establish a rate *per se* and given the power to establish a zone between minimum and maximum rates and if the pattern of discrimination applied in Robinson-Patman were used, there would be little need for the complicated suspension and hearing process which has severely limited the ability of many carriers to compete. Although there would appear to be no further need for special regulation of

securities, a certain minimum accounting regulation might be continued in order for the commission to have reliable information on which to base its analysis of minimum-maximum rates.

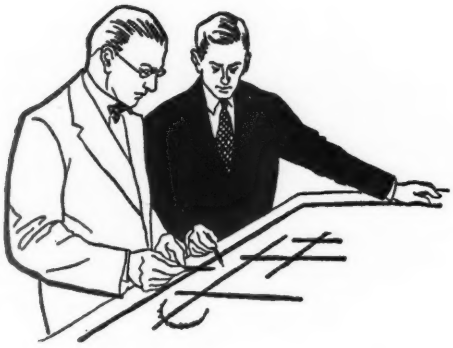
Public Interest and Public Policy

THE present public interest in transportation regulation seems to be influenced not only by past experience of abuses in transportation but also by the new economic philosophy of the post World War II full employment economy. It seems to lie primarily in obtaining economic stability and growth, stability through fair and responsible rates and service, and growth through making sure that the industry will be dominated by competitive alertness. One would not deny that the public interest in transportation is greater than that in most other businesses, but the opinion seems to be growing that the way to protect this public interest is to maintain the same kind of fair, but aggressive, competition as exists in such industries as steel, aluminum, automobile manufacturing, and electronics. While this is a far cry from the economist's concept of perfect or pure competition, visualizing in many cases rivalry among a relatively few in a given market, it is none the less real.

Perhaps the interest of the public toward transportation and toward the problem of competition between regulated and unregulated forms may be best reflected in a policy of three freedoms: freedom to compete, freedom from unfair and unnecessary subsidy of competitors, and freedom to be efficient. Present government regulatory and promotional policies do not now grant these three freedoms May we hope that carrier and shipper managers will lay aside their healthy competitive distrust long enough to support legislation which will give them these freedoms.

SHOULD these freedoms become a reality, and the political climate indicates that they may to a greater or lesser degree, we cannot overlook the fact that they will force on the regulated carriers a new kind of managerial aggressiveness. Removed from the protective umbrella of regulation, freed from the rigidities of government regulation, thrust more openly into the rivalries of the market place, and confronted with the challenge of a rapidly expanding economy, the now regulated companies will be forced to re-examine their managerial needs and resources. Policies and programs will have to be market oriented rather than government oriented. Experiment in rates and services will have to replace the forum of the regulatory commission. Increased emphasis on the quality of management—from foreman to president—will be required. Attention to business strategies will supplant preoccupation with legal strategies.

The prisoner can certainly become more productive if his chains are cast off, although admittedly government may prefer granting a parole for a period to make sure that avoidable abuses of the new freedom do not occur. Moreover, if a program of freedom were accompanied by a government policy of equal economic opportunity in transportation and of protection from monopolistic price and service discrimination, I should think that the shipper would soon benefit through lower costs and better service. American economic history proves that such benefits have flowed from other essentially competitive industries.



Ingenuity Engineering For Utilities

Public utilities operating in areas where there has been an almost explosive upsurge in demand for service, due to the migration and growth of industry and population, have special problems. And these problems call for special engineering to enable such public utilities to take full advantage of local conditions which can be used to assist operations.

By JANE ESHLEMAN CONANT*

THE Dutch boy who blocked the hole in the dike was a laudable little fellow. But he is an example of exactly the opposite of what America's public utility companies have been doing in recent years.

The utilities could not wait until the hole developed and then try to close it. Somehow they had to know far ahead of time what was going to happen—and to build a bigger dike years before a crack could even start.

Of course in this case the problem was the flood of new demands for service, sweeping in on the tide of wartime and postwar industrial expansion, steady growth of population, and mushroom development of new suburban communities.

In the past decade, the call for utility services has grown tremendously. The companies have had to meet present needs, anticipate future demands—meet those, too—and then anticipate even more.

It was something like working on an automobile engine to increase its power—with the engine running at full speed. It was a man-sized job, requiring gigantic outlay of money, know-how, and materials.

SOME of the things that have happened in the wartime and postwar history of California's Pacific Gas and Electric Company are typical of what utility companies have been doing generally.

*Member, editorial department, *The Call-Bulletin*, San Francisco, California. For additional personal note, see "Pages with the Editors."

PG&E, now a young-in-spirit centenarian, is owned by 217,000 stockholders, mostly Californians themselves. It supplies electricity and gas in the central and northern parts of the state, serving 47 of the 58 counties.

THIS business-managed utility company, like many others throughout the country, has tackled the widest variety of problems and faced up to many challenges. For PG&E they ranged from government policies which actually delayed some key projects, to the construction of a steam plant at an important location where the water supply had to come from the sea.

Sea water is not known for the good it does to boilers. The company solved this one by transforming the salt supply to fresh.

This utility talks about this sort of thing in terms of "ingenuity engineering." One of the very first examples was the conversion of the salvaged aft end of a wrecked steamer into a dockside wartime power plant for the northern California seaport town of Eureka.

SOME of the other big and little steps were experiments with cloud seeding for snow at high altitudes in the Sierra, development of radar-detection systems for line breaks, partnership agreements with other agencies, public and private; and pilot work in the production of electricity by atomic energy.

Here are some of the representative high lights of this particular company's energetic, sometimes unconventional, and successful battle to keep ahead of the flood of progress.

Many other firms will see the reflection of their own activities in the account.

Government Problems

THE story of PG&E's troubles with Uncle Sam over the hydroelectric development of the Kings river, for instance, is pretty well known. It was significant in two phases: First, it served to delay development of the Kings for years beyond the time the company was ready to go in, and when the power was sorely needed. And, second, it was an example of one reason why PG&E's traditional ratio of hydroelectric production, substantially greater than steam, has now changed to give steam the lead.

Only now, in 1956, is the company able to go ahead with the Kings project, which ultimately will add 261,500 kilowatts to the California power system.

PG&E was ready in 1949 but, as FORTNIGHTLY readers know, the Bureau of Reclamation's desire to keep the stream for itself set off a fight in Congress and stopped all development of the Kings until PG&E finally won the license, only recently.

Hydro-Steam Ratios

CALIFORNIA, with its wealth of fast streams tumbling down the western slopes of the Sierra, has traditionally been a hydro state. Its first hydroelectric production dates back to the last century.

But eventually most of the best streams were harnessed. There were some left, and PG&E planned to develop them, too. But on the Kings, for instance, this was delayed. The company had its increasing flood of industrial and residential customers to serve—and it could not wait.

It did not need to tangle with Washington to build huge steam plants—so it went ahead and built them. Big ones—two

of 575,000-kilowatt capacity, one of 660,000 kilowatts, and several others.

That provided power when it was needed, and without the delays involved in some hydro licenses.

The dominance of steam was inevitable, anyhow, because of the increased efficiency being wrought by technological advance. But such elements as these hastened the changeover. And the comparison is striking:

As of the end of 1945, the gross normal operating capacity was hydro, 1,039,500 kilowatts; steam, 618,800. This summer, ten and a half years later, it was hydro, 1,451,500; steam, 2,866,300, representing not only a fundamental change but a tremendous over-all increase in capacity.

Atomic Energy

THE steam-over-hydro ratio is bound to go up even more, once atomic energy moves into the fuel field. PG&E is one of the companies now taking a good, close look at the trend to atoms.

Near Livermore, an inland city in central California east of San Francisco, the company is co-operating with General Electric in a project which will generate the country's first privately financed atomic electric power. GE is setting up the "pilot" nuclear reactor, and PG&E will install and operate the turbogenerator and receive its 5,000-kilowatt output into its system.

THE multimillion-dollar enterprise will lie in rolling hill country once tenanted only by grazing beef cattle. The GE nuclear reactor will produce steam which will power the PG&E turbine exactly as does steam generated by oil or coal.

All concerned agree that this—as of now—is not an economically practical way of producing electricity. It is going to cost about ten times as much per kilowatt as do conventional plants. But this is primarily a laboratory, a study aimed at opening the way to ultimate commercial use of the atom.

It is a working model for the 180,000-kilowatt Chicago plant to be built by GE for the Nuclear Power Group, of which the members are Commonwealth Edison Company, PG&E, American Gas & Electric Service Corporation, Bechtel Corporation, Union Electric Company of Missouri, Central Illinois Light Company, Illinois Power Company, and the Kansas City Power & Light Company.

What is found out at Livermore will be put to good use at Chicago.

❦

¶ "IN *the past decade, the call for utility services has grown tremendously. The companies have had to meet present needs, anticipate future demands—meet those, too—and then anticipate even more. It was something like working on an automobile engine to increase its power—with the engine running at full speed. It was a man-sized job, requiring gigantic outlay of money, know-how, and materials. Some of the things that have happened in the wartime and postwar history of California's Pacific Gas and Electric Company are typical of what utility companies have been doing generally.*"

Conversion of Sea Water

THE steam plant at Morro Bay, in San Luis Obispo county on the coast about midway between San Francisco and Los Angeles, is an example of PG&E's "ingenuity engineering"—which is another way of saying "If it needs to be done—do it!"

Company surveys showed that a new plant should be built somewhere in that area. It had to be steam, since the coastal country there lacks hydroelectric-type streams.

To make steam, there has to be water. Where to get it at Morro Bay? There were two creeks, Morro and Toro. They might be dammed. Or, wells might be dug. But the engineers found that either or both might jeopardize the town's own water supply, none too ample as it was.

The only other water around there was in the Pacific Ocean. It had only one thing to recommend it—there was plenty.

Sea water had not been used for such a purpose before this. But the assignment was given PG&E's engineers, and they came up with this arrangement:

Two sets of sea water evaporators were devised, one for each of the plant's 150,000-kilowatt units. Each can handle 150 gallons of sea water per minute, the equivalent of 50 gallons of fresh water.

Each unit has three cylindrical tanks, horizontally mounted, 17 feet long by 6 feet high. The lower half of each tank contains 290 one-inch tubes set seven-eighths of an inch apart.

Steam from the turbine itself is used to heat the tubes, over which raw sea water is passed. The water boils, the steam rises to the top of the evaporator unit, and is condensed into fresh water for the boilers. The now super-salty remainder is drawn off from the bottom of the tanks and returned to the sea.

The Morro Bay plant has slightly higher operating expenses than other steam plants. But the company weighed all the elements—the need, location, line losses if the area were served by a plant farther away—and decided on the "ingenuity engineering" solution.

Weather

UNPREDICTABLE and all-important, it keeps PG&E's people constantly occupied. Like fire, it can bring great benefits, and can cause disaster. It sets up a variety of activities, from the use of radioactive isotope snow gauges to Sno-cats, helicopters, flame throwers, radio, and old-fashioned snowshoes. High lights:

Radar

ROUGH weather is any electric power company's big winter headache. Heavy snow, high winds, or falling trees snap power lines, often in rugged and isolated mountain territory. PG&E is using a sort of electronic aspirin to cure this pain: radar for fast detection of the breaks.

It used to be that the field crews had to check damaged lines by repeated switching, examining the entire length a few miles at a time until the break was found. Now the radar sleuth sends high-frequency impulses along the wire to search out the trouble spot almost instantly. When the impulses reach the break, part of the pulse energy bounces back to the sending set. The operator simply looks at a calibrated dial and reads the distance of the break from the transmitting point.

The Price of Delay in Power Development

"THE story of PG&E's troubles with Uncle Sam over the hydroelectric development of the Kings river . . . is pretty well known. It was significant in two phases: First, it served to delay development of the Kings for years beyond the time the company was ready to go in, and when the power was sorely needed. And, second, it was an example of one reason why PG&E's traditional ratio of hydroelectric production, substantially greater than steam, has now changed to give steam the lead. Only now, in 1956, is the company able to go ahead with the Kings project, which ultimately will add 261,500 kilowatts to the California power system."

During one bad storm, a 60,000-volt line went out between Cottonwood and Eureka, in some of northern California's most handsome—and most rugged—countryside. Within minutes, the radar detective spotted the break about 75 miles from Shasta substation. Trouble shooters in a radio-equipped Sno-cat were dispatched without loss of time.

Cloud Seeding

SOMETIMES there is too much weather; sometimes too little. That happens often in semidesert California, where mid-year droughts alternate with torrential winter storms. The snowfall which builds a mountain "reservoir" for summer run-off is the same now for the tremendously increased population as it was a century ago when the migration to California first started.

Many agencies over the country are experimenting with ways to make it snow when Mother Nature herself does not feel in the mood. PG&E is on that list.

The experimenters work with ground-based silver iodide generators, carefully checking when, where, and how much rain or snow can be precipitated by artificial means. In some winters, when the customary solid snow "reservoir for summer water" does not pile up high enough in the mountains, effective cloud seeding might be of priceless value.

Water

THIS precious commodity concerns PG&E in most important ways, including controlling the flow, and setting up independent and mutual-agreement plans for its best use and conservation.

Flood Control

PG&E played a major rôle in the disastrous rainstorms and floods of California's violent 1955-56 winter.

Fifty-seven company reservoirs caught and held back 470,000 acre-feet of water during the December, 1955, deluge—water which otherwise would have plunged unchecked downstream to wreak even more havoc than was done. Other reservoirs such as those of various irrigation districts, the city and county of San Francisco, and Southern California Edison Company captured 670,000 acre-feet. Federal flood-control facilities helped harness some rivers. But the private dams accounted for a third of all the flood waters captured.

PG&E's reservoirs on one river alone—the Feather—stored 140,000 acre-feet, helping substantially to spare the cities of Oroville and Marysville.

The storms led to the stern chastisement of columnist Drew Pearson by Editor D. L. Beebe of the Oroville *Mercury-Register*.

Pearson wrote that many of the floods could have been prevented, and "the utility which has chiefly fought flood-control dams in northern California is the Pacific Gas and Electric Company." He contended that PG&E objected to the proposed Oroville dam, on the Feather river above the city, and implied that the company was thus the villain of the flood piece.

Editor Beebe sharply straightened out the record in an editorial published in January. It was not PG&E but the Bureau of Reclamation which stymied the Oroville dam, he declared. He added that the business people of his city "felt they had been led up to green pastures by the bureau and then literally sold down the river."

PG&E's over-all record in the retention of flood water was pointed out in a January letter from Executive Vice President Robert H. Gerdes to Representative Clair Engle, northern California Democrat.

Gerdes cited the utility's previous co-operation with the flood-control and conservation projects of the federal government, and reaffirmed the work-together pledge for the future.

In many already existing setups of this kind, the company has "partnership" agreements with public agencies at the latter's irrigation and flood-control dams, providing an assured market for electric power generated at the sites. It is offering such partnership agreements for installations yet to be built, including the Trinity river project.

Mutual Agreements

A CASE which bears directly on the point is the Tri-Dam project, a $50,000,000 job by the Oakdale and South San Joaquin Irrigation districts, to provide 230,000 acre-feet of storage capacity on the Stanislaus river.

It demonstrates the benefits of co-operation by public and private agencies in mutual, privately financed arrangements for multiple purposes, without costing the taxpayers anything at all.

Work is now in progress on the project, which calls for the construction of three dams on the Stanislaus. They are

the Donnells, with a storage capacity of 64,500 acre-feet; Beardsley, 97,500 acre-feet; and Tulloch, 68,400 acre-feet.

The districts will build power plants at all three sites. PG&E will buy and distribute the 81,900-kilowatt dependable capacity output.

For the irrigation districts, it means the conservation of water for San Joaquin valley farms, and, of course, flood control. For PG&E, it means another source of power to serve its constantly expanding demand.

PERHAPS the keynote of the entire partnership was sounded in the public announcement of the $41,500,000 bond issue which started the project's financing last year.

"Pacific Gas and Electric Company has agreed to make semiannual payments for electric power generated by the facilities of the Tri-Dam project, which payments in the opinion of the districts are fully sufficient to pay the principal and interest of the Tri-Dam revenue bonds of both districts," the statement read.

In other words, as it was described by Ralph A. Tudor, former Interior Under Secretary and now president of the Tudor Engineering Company of San Francisco:

> The present program will not cost the districts one dollar and it is probable that the districts will even recover all of the funds they advanced for preliminary studies, engineering, et cetera. The districts will own all of the dams, access roads, power plants, and power plant equipment including step-up transformers, and they will operate all of those facilities. They will not own the transmission lines, as the power will be delivered to the PG&E at the bus bar.

RADAR, cloud seeding, partnerships, atomic energy, sea water, and flood control—a colorfully varied display of the activities of a public utility company.

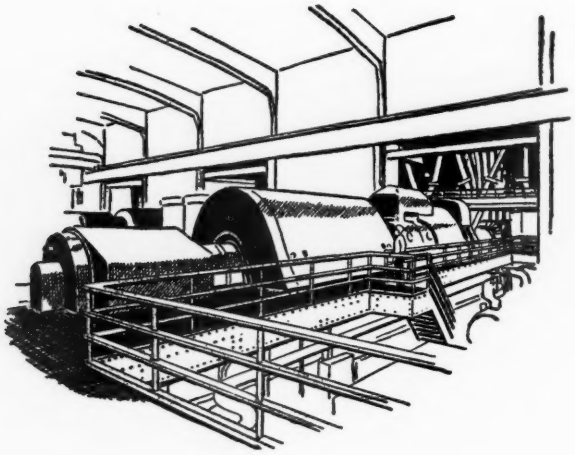
For good measure, there is the spending of $1.5 billion for the expansion of gas and electric facilities since World War II, the continued planning of more expansion—and such by-products as the conversion of a depleted underground gas field near Winters as an underground storage tank.

The picture becomes one of "ingenuity engineering," indeed.

"THE Hoover Commission has recommended changes which would save an estimated $5 billion—more than the whole government used to cost. Mostly this $5 billion now is just being wasted. It is unnecessary spending. But the money comes out of the pockets of taxpayers, who otherwise could use it for their own purposes. . . .

"After all, delay accomplishes nothing. But it costs the taxpayers money. They have a right to squawk. And it would be a good idea if they did."

—EDITORIAL STATEMENT,
San Francisco News.



Atomic-powered Service For New England

Among the nuclear reactor projects already licensed by the Atomic Energy Commission for development by business-managed public utility groups is the so-called Yankee atomic project, sponsored by twelve New England electric utilities.

By T. E. J. KEENA*

THE taste of a hamburger was solemnly considered by some 250 or more reporters and photographers packed into a New England press conference on March 30, 1955. It was like any other hamburger, said the Navy officer. But the reporters knew differently.

This hamburger had been cooked in the galley of the submarine *Nautilus,* out of New London, Connecticut, under way on nuclear power. That meant the galley stove was heated by electricity generated from the atom. And for New England, the atom means much. If it worked to cook hamburgers for these submariners, it might soon be turning on lights, television sets, or helping do the dishes around the home as well.

In fact, even as the results of this naval use of nuclear electricity were being discussed, twelve New England utilities were completing their plans to bid for a chance to build a private nuclear power plant.

"All of us were convinced that nuclear power was a practical fact, surely coming," says William Webster, president of the Yankee Atomic Electric Company.

* Editorial department, *The Hartford Courant,* Hartford, Connecticut. For additional personal note, see "Pages with the Editors."

"The people of New England want progress."

And when the Atomic Energy Commission opened its mail that same spring to count answers to its invitation to build reactor plants, Yankee's proposal was among the four received. We would like; said the Yankee Atomic Electric Company, to build a pressurized water reactor (like that of *Nautilus*) and plant to provide 100,000 kilowatts or more to our customers.

THE AEC pored over the bids and talked about details. How much did the company expect in the way of waiving fuel use charges and how much to process fuel elements? There was no immediate meeting of the minds and the AEC turned the Yankee people down on their first offer. Yankee came right back with a new one.

This was more like it, said the commission's negotiators. They began working out the finer details. Then the proposal went up to the full commission for examination. On June 6th of this year—another D-Day for New England—Lewis L. Strauss, AEC chairman, announced that a contract had been signed.

Thus an organization representing nearly 90 per cent of the conventional electrical output serving six of the oldest states in the Union became the first to conclude a contract under the AEC power demonstration reactor program. It was bringing private resources into the nuclear age as the nation seeks to find ways to make nuclear power worth the money.

You cannot blame New England for being excited about the prospects of nuclear power. One of the facts of life is her geographical situation—tucked away in the northeast corner of the U.S.A., without any natural deposits of coal, oil, or natural gas.

Anything she wants, she generally has to import. High transportation costs are one of the reasons why utility rates are relatively high in this corner of the country. Her average bill is a great incentive to seeking out new and better sources of fuel.

Picture, then, her thoughts on hearing that a one-inch cube of pure uranium 235 is equivalent to 2,600,000 tons of coal or 500,000,000 gallons of oil. That can make a lot of electricity if you know how and it doesn't cost too much.

BUT the atom was born secret, and it was a long time before the stockpile of weapons information was such that the government felt secure enough to take the wraps off what it had learned in making bombs. Congress finally opened the doors in 1954 when it amended the Atomic Energy Act. For the first time, the hopes of private agencies for turning this mighty source of energy to peaceful uses were encouraged.

But the government still held tight grip on the fuel and some of the know-how. It suggested that private industry bid on the parts that interested it. Then the government could screen the offers for the most useful.

The first real project was a chance to build a working power plant in collaboration with the AEC. Individually some of the New England companies bid on it. But the best offer was made by Duquesne Light Company and work got under way to build a pressurized water reactor at Shippingport, Pennsylvania.

The next step was the power demon-

stration reactor program, announced in January, 1955. The AEC was prepared to encourage the construction of several different types of power reactors by industry. It would pick up part of the check for research and development.

By this time, most of the New England utilities were looking anxiously for a way to get into the program, to get their hands dirty, to learn how. But they recognized, too, that only a few could build a plant of enough size to warrant being fitted into the expansion program laid out to meet New England's needs.

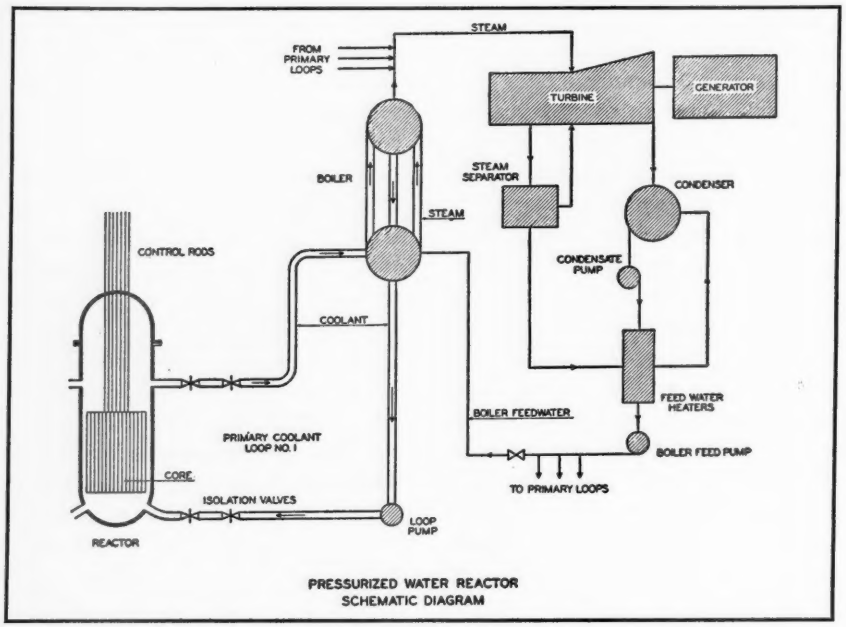
By getting together, they had reasoned, they could change the picture. They could share the cost and share the know-how. Because New England has a highly developed system of power interconnection, they could share the power turned out.

Roger Coe, vice president of Yankee Atomic, put it this way:

By banding together in a common effort, the twelve companies can tackle construction of a large unit without significant effects on their earnings statements, can finance the large investment without strain, can easily absorb their portion of the power, share the risks, split the benefits, and acquire the know-how and experience needed for the future.

On September 16, 1954, then, Yankee Atomic Electric Company had been officially born. Its head is William Webster, executive vice president of New England Electric System. Its directors represent the twelve member companies. Under Massachusetts law, such a corporation can be formed to make power to be bought and distributed to the members and their customers.

The member companies—and the share



PRESSURIZED WATER REACTOR
SCHEMATIC DIAGRAM

they may ultimately have in the produced power—are as follows

New England Electric System	30 per cent
Connecticut Light and Power Company	15 per cent
Boston Edison Company	9.5 per cent
Central Maine Power Company	9.5 per cent
Hartford Electric Light Company	9 per cent
Connecticut Power Company	.5 per cent
Western Massachusetts Electric Company	7 per cent
Public Service Company of New Hampshire	7 per cent
Montaup Electric Company	4.5 per cent
New England Gas & Electric Association	4.5 per cent
Central Vermont Public Service Corporation	3.5 per cent

(New England Gas & Electric Association represents the combined shares of New Bedford Gas & Edison Light Company and Cambridge Electric Light Company.)

But if Yankee is all twelve companies, just what is Yankee? How does it work? That is a question hard to avoid.

Actually, Yankee is just a device, an instrument to get atomic power for New England as fast as possible. It is no study project; the people who work for it and with it mean business.

TAKE Webster, for instance. A graduate of Annapolis, he put ten years in the active Navy before going to the present New England Electric System in 1928. He was vice president in 1942 when he was borrowed to be a consultant in the office of scientific research development. From 1948 to July, 1949, he was on leave of absence to be an assistant to the Secretary of Defense. From 1950 to 1951, he was chairman of the Research and Development Board of the Department of Defense. He was a consultant to the AEC from 1947 to 1954. He has infectious faith in the possibilities of the atom.

"It is time to get going," he told his associates when the company was formed as a result of a meeting called by New England Electric. "Let us get in the act and be one of the first regions to get nuclear power. That way we can learn a lot and still be in line for any breakthrough."

Other New England companies had become equally interested in the possibilities. Some had had engineers on loan to the government for wartime public service who came back and talked glowingly of the atom. Others put their best young engineers into study groups like that of Dow Chemical-Detroit Edison, to work on the problems.

WHEN the twelve companies formed Yankee, they furnished most of the man power as well. It is not a large organization. Its ultimate strength may range between fifteen and forty men. Its management chart is headed by the twelve directors who represent the member companies, with Webster as president.

The activities of the company are handled through three vice presidents. One of these, currently Sherman R. Knapp, president of Connecticut Light & Power, reflects the interests of the directors. Roger J. Coe is in charge of technical development, assisted by Glenn A. Reed. The third vice president is H. M. Johnson, who is assigned the administrative responsibilities. It is part of Johnson's job to keep figuring the economics of the plant.

Some of the six technical areas under these executives already have their chiefs chosen. Others remain to be filled. The operating heads will hire assistants as needed. One area involves the nuclear aspects of the plant and another the conventional, or civilian, aspects. A third is con-

Different Kinds of Atomic Power

"WHEN private industry was finally asked into the nuclear energy business, the Atomic Energy Commission and its laboratories had already proved that there were many different ways to make power with the atom. Some would be easy to harness—but they were likely to be expensive in the long run. And there is no use generating power from the atom if it is simpler and less expensive to do it with the most modern conventional designs. Other types of reactors would be difficult to design and complete and make work—but, in the long run, they might give you economically competitive power."

cerned with controls and a fourth with site safety. The fifth covers mechanical details. The sixth takes care of fuel element development.

How can such a limited number of men plan this large an operation? The answer lies in the talent available in the New England area and the experience of the member organizations, on which the Yankee group draws freely.

Boston, where Yankee has its headquarters, is one of the greatest complexes of industrial research in the world. It is the location of a burgeoning nucleonics industry. It has tremendous educational facilities available at M.I.T. and Harvard, not to mention others.

From these institutions and firms, Yankee hires consultants as needed to advise on any problems that come up. These usually concern important decisions. Thus Westinghouse is the prime contractor on the reactor and Stone & Webster on the plant. When all the recommendations are in and have been weighed, the depart-

ments have spoken, and the executive wants to make sure he is right, then he calls on the experts to take a final look and give their opinion. Not only does Yankee utilize the local experts, but it also has the services of Nuclear Development Corporation of White Plains, New York, on its team.

But what about the ordinary leg work, such as clerical help, purchasing, and the like? There again, Yankee has the advantage of the experience of its member organizations. It uses the New England Power Service Company, an affiliate of New England Electric System. The company does all the odd jobs, from seeing that surveys are made to buying rights of way and property sites.

Thus Yankee, despite its limited size and its relative youth, is already a practical, working organization. It is a combination of directy employed people, loaned employees, hired laboratories, consultants, and contractors.

But, as an organization imbued with the desire to build a nuclear power plant, its most important task was to make decisions. What sort of plant would it build? What kind of reactor would it choose as the best and most efficient atomic furnace in which to generate heat to make electricity?

WHEN private industry was finally asked into the nuclear energy business, the Atomic Energy Commission and its laboratories had already proved that there were many different ways to make power with the atom. Some would be easy to harness—but they were likely to be expensive in the long run. And there is no use generating power from the atom if it is simpler and less expensive to do it with the most modern conventional designs. Other types of reactors would be difficult to design and complete and make work—but, in the long run, they might give you economically competitive power.

"The atomic energy business," Webster said recently, "is at the same point the automobile business reached around the turn of the century, in 1905 and 1910. You had the Stanley Steamer and you had the prospect of electric cars. Then there was the internal combustion engine, too. Which design would you choose? Which would you put your money into? Especially as long as you did not know that the day would come when there would be a filling station on every corner."

WEBSTER and his team chose the pressurized water reactor. There were four main reasons:

(1) It was the safest, with a serious accident virtually impossible. That, in highly developed and populated New England, had to be taken into account.

(2) It appeared to be reasonably suitable to improvement through any advances in design. Thus, once it was completed, it could take advantage of developments in the art of fuel utilization, or at least more readily than other designs.

(3) It had the most proven history in power production. Besides *Nautilus* and the prototype in Idaho, there was the Shippingport plant. Anything new that came out of these designs could be available to Yankee.

(4) The cost of such a plant could be accurately estimated. So far, Yankee figures it will cost about $250 per kilowatt to install the plant. That is better than the $500 or more per kilowatt that the first estimates reached on earlier plants, even if

it still falls short of the $160 to $200 per kilowatt cost of the best modern conventional designs.

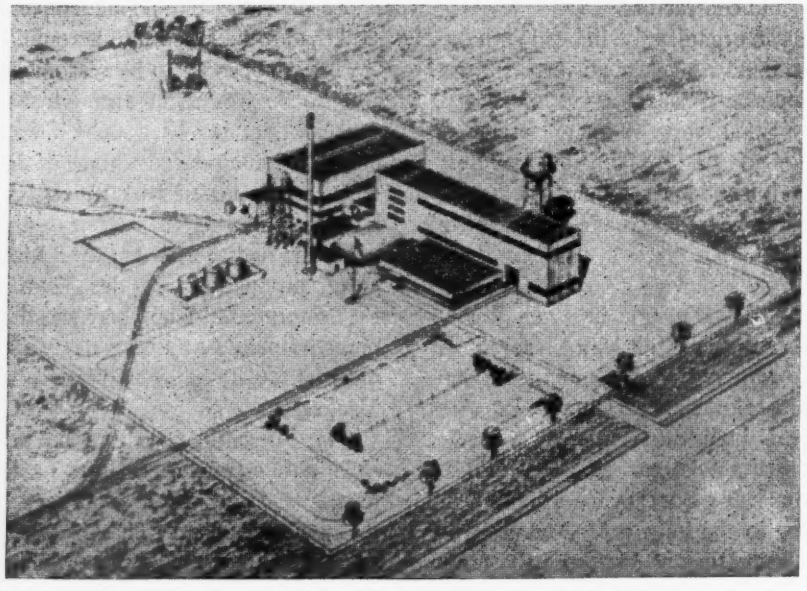
THE entire plant will cost in the neighborhood of $35,000,000. It will be privately financed. But $15-$17,000,000 of that figure represents what you would build anyway, an investment in conventional plant like the turbine, condenser, generator, and connections. The power itself will be distributed largely over the existing network of transmission lines.

It is the other $15-$16,000,000 of the total cost that represents the nuclear part of the plant. Yet even that has much that is conventional. Outside the reactor core, its controls and shielding, the rest is fairly recognizable.

From the reactor core, for instance, and the pressure vessel in which it sits—a cylindrical steel tank nine feet in diameter, 23 feet high, with walls eight inches thick lined with stainless steel—runs a loop carrying water that has been heated by the nuclear energy. This loop passes through the chamber shielding the pressure vessel and into a boiler, or heat exchanger.

Here it heats water passing through another loop that pipes out steam, at 600 pounds pressure, across a mythical line that we can draw to separate the nuclear from the conventional. The steam drives a turbine and makes electricity in the usual way. Note that the slightly radioactive water from the core, where it has been exposed to nuclear bombardment, does not leave the nuclear part of the plant but merely heats other water in the exchange.

Instead, the radioactive water circles around back through a pump and is forced into the reactor again at 2,000 pounds



pressure. That keeps it in the liquid state. The process in which it is used is creating some 480,000 kilowatts of thermal power to produce a maximum of 134,000 kilowatts of electricity. The latter figure is the net capability of the new plant.

It is the design of the reactor core itself that is the central problem. That is the purpose of the research and development contract signed with the AEC. The latter will do up to a million dollars worth of research on the best way to make the core work and will underwrite up to $4,000,000 worth of work done in private laboratories. If any more research is needed, the company must pick up the check.

In return, anything the company picks up of technical and economic interest in development, design, construction, or operation of the reactor is in the public domain. It must report fully to the AEC, which will control the patents.

Yankee chose as its site for the new plant, the town of Rowe, in northeastern Massachusetts. The area has an already installed network for the transmission of power to be produced.

It also has an abundant supply of water, the cooler and moderator in the reactor. This water can be taken from Sherman Pond of the Deerfield river, a stream with 186 square miles of drainage area.

And, as an additional reassurance for New England, the area is relatively remote from the great population centers. The nuclear people feel that when people get accustomed to cooking on atomic burners, they won't fear it much more than fire. But right now there is a practical public relations consideration in selecting a rugged site.

If this sounds as if Yankee Atomic were ready to build tomorrow, it is not. There are a great many alternatives on which choices are yet to be made. Take the reactor, for instance.

The pressure vessel has already been described. It would be clad in stainless steel, perhaps just as an outer lining, perhaps with both inner and outer. But it is still the most difficult pressure vessel ever built in the United States, as Admiral Rickover has remarked from his experience in overseeing the Shippingport project.

And there are alternatives throughout the design that need engineering study and cost analysis. Should they be stop valves in the loop that take the radioactive water out of the core? Should they be a packed type or hermetically sealed valves of the hydraulic variety?

All of these design decisions "are very much connected with the philosophy of design, economics, and safety," Glenn A. Reed told an engineering group in western Massachusetts. And Yankee's philosophy is that it wants something with a reasonable hope of being economically competitive, something that can take advantage of anticipated improvements and yet not sacrifice any measure of safety.

How long will it take? "We are going ahead in the confidence that construction will be commenced next spring and that the completed plant will be in operation in 1960," Webster estimated for the Joint Committee on Atomic Energy.

Confident or otherwise, Yankee Atomic's men are also practical and realistic. They are working now on getting subsoil explorations at the site, planning meteorological investigations, and background monitoring. They are talking over with

the insurance industry—and with Congress—problems along that line. They watch the progress of Duquesne and the AEC as the pressurized water reactor undergoes constant refinement.

"We are already benefiting from the Shippingport and naval reactors," notes Webster. "Having the same contractor for the reactor, we may ultimately install what would be the third generation of that design."

If he had it to do all over again, would he still endorse the pressurized water reactor as the most feasible design?

"I am just as happy as ever about the choice," he smiles. He points out that three of the reactors being built in the power demonstration program—Duquesne, Consolidated Edison, and Yankee—are working from the same fundamental design, the same technology.

Is the program moving fast enough? He thinks it is well advanced and gathering momentum. If Yankee is making full-scale electricity by 1960, with an improved core design, he believes other companies in the country will be crowding in with plans to install nuclear capacity of their own. The 134,000 kilowatts that are the rated capability of the Rowe plant represent a significant addition to New England's electrical capacity. The output will be approximately 4 per cent of last year's generation in the entire New England region, while its capacity is 3 per cent of the 1955 installed capacity.

If New England continues to add kilowatts to satisfy its surging economy at the rate of 300,000 to 350,000 a year, then the Yankee plant measures out to more than one-third a year's addition. Its size is, right now, slightly larger than any single unit in the area it serves, although two larger modern conventional plants are to be on the line when Yankee comes in.

Looking back on the two-year history of Yankee, Webster is tremendously proud of the co-operation and spirit it has evoked. The twelve member companies have given generously of their time and effort, in a region where corporations and people are traditionally reserved. At the same time, New England's governors and Senators have loyally worked to help the company achieve its goal.

Once Yankee's Rowe plant is on the line, will the corporation wither away as the member companies absorb the power and the example and proceed independently to build new nuclear plants for their own systems? It is, after all, only a device to get a demonstration reactor built.

"Not necessarily," says Webster. "Such a corporation may continue to exist to operate the plant, distribute the power, or to take on new assignments."

One thing is sure, New England is proud that its company was first to contract to build such a plant and is currently in the lead. When Rhode Island's Senator John O. Pastore remarked of a trip he took on *Nautilus* that he had shaved by electric power generated from the atom, seen with light generated by atomic power, eaten food cooked by atomic power, and washed with water purified by atomic power, he was reminding the region of how much that energy source means to it. Yankee's men are well aware of the responsibility. They are determined that such power will soon be at the service of New England.

OUT OF THE MAILBAG

The TVA Yardstick

I NOTICE that a quotation attributed to me appears on the "Remarkable Remarks" page in your June 7th issue. It incorrectly reports me as having said that ". . . the framers of the TVA Act had no idea that its power rates would come to be regarded as rate yardsticks elsewhere."

I have no wish to avoid the implications of what I actually said. The text of my talk is enclosed. Unfortunately, a newspaper mistakenly reported my words at the time and it may have been this report that reached you.

My actual words to the Knoxville Technical Society were:

> The framers of the TVA Act had no idea that TVA rates were to be a precise measure of rates elsewhere. As Senator Hill (a founder speaking of the creation of TVA) points out: "I do not remember a single suggestion that we expected TVA . . . to set ideal rates which should be therefore established throughout the country. That is a notion you would get from utility propagandists. We recognized that the cost of electricity varies . . . We hoped that the Congress, the state regulatory commissions, private power companies themselves, and the public generally, would learn to compare the cost items in the several categories, to discover the reason for variance to the end that electric rates should be established on the basis of facts about cost and not in response to pressure or propaganda.

In brief, TVA's value to all electric power consumers is as a point of *cost* comparison, not as a *rate* measurement.

—AUBREY J. WAGNER,
General manager, Tennessee Valley Authority.

Utilities and Politics

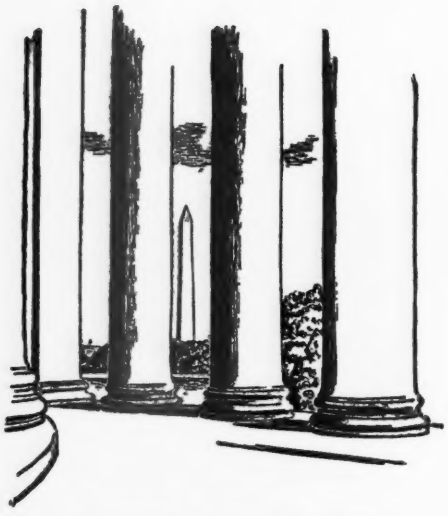
I WAS much interested in your "Washington and Utilities" commentary on the record of the 84th Congress regarding legislation of special interest to public utility industries. Actually, the record of the 84th Congress may be more noteworthy for what it did not do than for what it did.

Consider the following legislation which might have passed but did not:

1. The bill to put the federal government further into the hydroelectric business by authorizing a federal high dam on the Snake river, canceling valid licenses already issued by the FPC to the Idaho Power Company.
2. The bill to require the AEC to develop and operate atomic power plants.
3. The bill to put the state of New York into the power business through Niagara power development under a discriminatory "preference" for government power distributors and co-ops.
4. The bill to destroy the court-upheld jurisdiction of the FPC over independent natural gas producers (passed but vetoed).
5. The bill favored by the administration to authorize the Fryingpan-Arkansas power and reclamation project.

All these, except perhaps Hell's Canyon, are almost certain to come up again at the next session. The situation emphasizes the importance of the outcome of the election next November, not only as to the presidency but also the control of the 85th Congress. This 84th Congress was a more or less standpat Congress. The 85th Congress could go either way, but it probably will not standpat. Give us more analytical articles on these developments during the campaign months ahead. These are more critical times for public utility industries than some may realize.

—HAROLD LEMAY,
New York, New York.



Washington and the Utilities

Record of the Session

THE administration broke better than even with the opposition-controlled Congress on project legislation during the hectic closing days of the second session. Without coming right out and saying so, in the form of either a "must" list or a "must not" list, the Republicans in Congress were generally supposed to be aligned as follows on various legislative proposals:

1. Opposed to a federal high dam at Hell's Canyon which would cancel the licenses already issued by the Federal Power Commission to the Idaho Power Company to build small hydroelectric dams on the Snake river in Idaho.

2. Opposed to a bill to authorize the New York State Power Authority to develop hydro power at Niagara and sell the same under a so-called "preference clause," which would foster public ownership by giving government power agencies and co-operatives an absolute priority on the right to buy such power.

3. In favor of the $156,000,000 Fryingpan-Arkansas multipurpose reclamation and power project, of great interest to Congressmen seeking re-election in the Rocky Mountain states.

4. Opposed to the Gore Bill to put the Atomic Energy Commission into the atomic power business by forcing it to develop and build commercial nuclear reactor plants.

5. In favor of two alternative bills to assist business-managed electric utility companies and other private industry to build nuclear power plants by (1) providing government-backed insurance for nuclear plant liability; (2) exempt private companies joining in such projects from becoming subject to full Securities and Exchange Commission jurisdiction under the Holding Company Act.

ON the foregoing five lines, the administration won a clear-cut victory when Hell's Canyon was defeated in the Senate 51-41. The victory in stalling off the Niagara state power bill was blurred by the somewhat confusing position taken during the last weeks of the session when several New York companies indicated that they would swallow the measure (in order to get Niagara power plants started) provided the thorny preference clause was first removed. It was not and the bill did not. It died in the House Rules Committee,

with most Republicans against it up to the end.

The defeat of the AEC atomic project bill was a tribute to astute GOP parliamentary finesse on the House floor. The defeat of the two bills to aid private company development was a standoff, because the SEC came to the rescue of the Holding Company Act exemption idea by virtually putting it into effect by administrative (SEC) rule rather than legislative act. The insurance feature, of course, is dead at least until next session.

The House floor vote defeat of Fryingpan-Arkansas, after the Senate had passed it and the House Rules Committee had almost strangled it, was a real disappointment to the administration, however.

ADDING all these items up, the score reads: three for the administration, one for the opposition, and one draw. Considering earlier legislation of the session (a draw on TVA financing and a veto of the gas bill, which cut across both party lines), the record of the Democratic 84th Congress, on government public projects and other legislation affecting utilities was not so bad, from the GOP point of view. Certainly, it was nothing for the Democratic power bloc—which favors government anywhere, anyhow, and no matter what—to cheer about.

One might add to this the admission of some measure of relief for utilities in the form of reimbursement of expense on relocation due to highway construction (in the giant federal-aid highway bill) and say it was not a bad year for the administration party line, whenever there was a party line on such matters.

Even on minor project squabbles, the government power bloc had its troubles. When the Senate was passing the $1.5 billion rivers and harbors bill, authorizing projects from New England to Alaska, the two Oregon Democrats tried to pin the "utility" tag on a minor project ($122,000,000 for Bruces Eddy dam on the Clearwater river in Idaho). Senator Neuberger said it would ruin the fish and moved to strike it out. Senator Morse said it was part of a scheme by Idaho Power Company to sink Hell's Canyon and seconded Neuberger. Senator Dworshak (Republican, Idaho) said it would not ruin the fish and had nothing to do with Hell's Canyon. The motion was defeated by standing vote.

Hell's Canyon

THE Senate's rejection of the federal Hell's Canyon project removed the last legislative threat to construction by Idaho Power Company of the three smaller dams on the Snake river in Idaho. There still remains the legal questions involved in the appeal from the FPC licenses to the Idaho Power Company, yet pending in the U. S. circuit court of appeals for the District of Columbia. Even if the appeal were unexpectedly upheld, it could only mean a delay by a remanding of the proceedings to FPC for purposes of correcting technical errors in the record. Appeal was taken by government ownership advocates whose own status is in question. Furthermore, continued failure of Congress to pass legislation is regarded as diminishing the small chance there is of the appeal being successful.

The Hell's Canyon legislation in the House died without being brought out of the Rules Committee. Eight Democrats joined forty-three Republicans to kill the bill in the Senate vote last month. By providing the strength necessary to defeat the bill, they confused the government power and "give-away" issues, which members of the Democratic party have been trying to build up for campaign purposes. Republican candidates in the Pacific North-

west, such as former Interior Secretary McKay, are already pointing to the Hell's Canyon vote as a repudiation of government power advocates "who tried to play politics with the economic future of our region."

Out of the Frying Pan

DESPITE a last-minute telephone plea from President Eisenhower, the House killed his proposed $156,000,000 Fryingpan-Arkansas project in Colorado. By a roll-call vote of 194 to 179 the House refused to act on the Senate-passed measure. Opponents denounced the multipurpose reclamation project as a "fantastic" waste of money.

It called for the federal government to dig a six-mile tunnel through the Rocky Mountains to funnel water to farmers and townspeople of the semiarid Arkansas valley in southeastern Colorado. The vote came despite an eleventh-hour administration plea voiced by Republican Leader Joseph W. Martin, Jr. Martin told the House shortly before the showdown vote that President Eisenhower "only this morning called me on the telephone and told me he hoped this legislation would pass." But the Democratic-controlled House killed the project in exactly the same way it was scuttled in the dying days of the Republican-controlled 83rd Congress. Exactly two years ago the House, on a 195-to-188 roll call, killed a similar Senate-passed bill by refusing to consider it.

Chairman Clair Engle (Democrat, California) of the House Interior Committee urged the House to approve the measure. He called it "one of the key items of the President's legislative program." He noted that the Senate passed it without a dissenting vote. Opponents centered their fire on the project's $56,000,000 intermountain water tunnel, which would be constructed 9,000 feet high in the Rockies to funnel water eastward across the Continental Divide. Representative John P. Saylor (Republican, Pennsylvania) termed it "fantastic" and "ridiculous." He said the project would not work because the water would freeze in the wintertime. Most Republican members, however, regarded the vote as "spite work" by the opposition in a reprisal for the defeat of the Hell's Canyon legislation.

The Utility Probes

THE House Government Operations Subcommittee investigators were determined to get in a few final blows at the administration and at the electric power companies before closing up shop for the session. The Chudoff subcommittee launched its promised "thorough" investigation of the rôle played by utility companies in determining administration power policies and programs, by charging a group of Rocky Mountain utilities with seeking to influence government agencies or officials.

Chairman Chudoff (Democrat, Pennsylvania) claimed that the subcommittee had uncovered "a definitely organized effort by the Arizona Public Service Company, Idaho Power Company, Montana Power Company, the Utah Power & Light Company, the Public Service Company of Colorado, and the Ebasco Services Incorporated to influence the Secretary of the Interior." He referred specifically to printed material prepared by the utilities, to give former Interior Secretary McKay and other Interior officials "factual information" on power problems in the Rocky Mountain area.

The attack, aimed at the utilities, brought forth a sharp criticism by Republican subcommittee members accusing the Democrats of trying to "promote sociali-

zation as a national policy." Representative Hoffman (Republican, Michigan) stated on the House floor that "the sole purpose of the hearings is to create propaganda." In testimony, Colin W. Raff, executive assistant to the president of Montana Power Company, said the booklet prepared could hardly be considered in any way "improper" in view of the constitutional rights of free speech, press, and petition.

Mr. Hoffman declared that it was a waste of the committee's time to take up the matter of the publications "when no pertinent or relevant legislation whatsoever" could come out of the inquiry. Democrats on the committee will continue to make every effort to dig up material for campaign purposes, even though results so far have been unimportant.

CHAIRMAN Chudoff accused Republicans of "sabotaging" his group's inquiry. During the second week of hearings, subcommittee Republicans charged that the probe into various printed material, admittedly drafted by the electric companies and sent to Interior Department officials, was a politically inspired "project to defeat President Eisenhower." It is not yet clear whether Democrats will seek to keep the investigation going after adjournment, in an effort to dredge up material for the coming political campaign.

The gas bill lobbying of last winter did finally lead to some indictments. A federal grand jury has indicted the Superior Oil Company and two attorneys on charges of illegal lobbying in connection with Senate passage of the Harris-Fulbright Bill to limit FPC regulation of independent natural gas producers. The Senate committee, led by Chairman McClellan (Democrat, Arkansas), which has been investigating lobbying for and against the vetoed bill, charged the two attorneys with "galloping irresponsibility" in trying to sway the vote of Senator Case (Republican, South Dakota), but it did not report any specific violations of the Lobbying Act. The defendants are charged with conspiring to violate the Lobbying Act, attempting to influence a Congressman, and failing to register as lobbyists with Congress.

Industrial Plant Gets Gas

FPC Presiding Examiner Richard N. Ivins recently filed a decision granting a certificate of public convenience and necessity to Transcontinental Gas Pipe Line Corporation, of Houston, Texas, for the sale of an additional 1,500,000 cubic feet of natural gas per day on an interruptible basis to Owens-Corning Fiberglas Corporation at their Anderson, South Carolina, plant. Transcontinental will effect the deliveries with existing facilities.

Piedmont Natural Gas Company, Inc., of Charlotte, North Carolina, opposed the issuance of the certificate in the absence of a condition requiring that deliveries to Owens-Corning be offered on a basis of equal availability with offers of excess gas to Piedmont and other customers. Piedmont stated Transcontinental's proposed increase was "unduly preferential."

The presiding examiner stated, however, that Transcontinental's filed tariff does not entitle Piedmont "to any part of the interruptible gas available on the system unless and until Transcontinental offers it . . . When such an offering is made the tariff requires that it be made . . . on a nondiscriminatory basis and in proportion to their respective contract demands . . . under rate schedules for firm service."

Telephone and Telegraph

Radiotelephone for Rural Areas

AN engineering project which seeks to develop direct and speedy radiotelephone service for isolated rural areas was announced recently by the U. S. Department of Agriculture. The project has been planned by the department's Rural Electrification Administration engineers and will be carried out in collaboration with private firms under contract with the department.

While radiotelephones are in use by mobile subscribers and to some extent in rural areas, present equipment requires the subscriber to make a connection by voice communication with an operator. The object of the present project is to develop equipment that will work satisfactorily directly into dial telephone switching equipment. This development would require a change in the Federal Communications Commission's regulations concerning logging of calls, and such a change has been requested by the department.

In the development project, the department is ordering experimental automatic dial-operated radiotelephone equipment from two firms. Under each of the contracts, REA expects delivery in about six months of a dial-operated small fixed station operating on 110 volts for isolated subscribers, an automatic base station, and two dial-operated mobile units of 30 watts and 60 watts, respectively.

After development and manufacture, the equipment will be installed on REA-financed telephone systems and tested by REA engineers for a year or more to determine costs and quality of service. It is hoped that the test will show costs substantially below those of wire lines for isolated rural establishments while providing equivalent quality of service.

REA anticipates that the new equipment might serve rural areas in the following three ways:

1. By providing telephone service to isolated ranches and farm homes in areas that cannot be served by wire lines.
2. By providing mobile subscriber service where that is desired for farm, commercial, or industrial use in automobiles, trucks, and boats.
3. By providing radiotelephone communication between the telephone office and its own mobile units for maintenance and operation.

With the development of transistors, it may be possible for the fixed-station radiotelephone to continue operation in electric power emergencies by use of a recently developed lifetime rechargeable battery.

Streamlined Fire Alarm System

THE influx of approximately 135 southern California fire chiefs, city administrators, city officials, representatives of General Telephone Company and other telephone companies to the city of Whittier, marked the installation of a new emergency alarm system by General Telephone Company of California recently. This is the first system of its kind in California and one of a very few in the United States.

Acquisition of the new telephone alarm system is a result of Whittier Fire Chief A. B. Alford's insistence during the past several years that the city should have only the best and most modern system available. In 1948 the Board of Fire Underwriters of the Pacific recommended a telegraphic alarm system following its study of Whittier's fire department setup. The lowest bid received by the city for such a system was about $45,000, not including the continuing cost of maintenance. Alford figured that maintenance would require the full-time services of an electrician.

In 1950 Alford conducted a survey of several cities having the telegraphic type of alarm system (the only type approved at that time) which showed that only a small percentage of fire reports originated at the "pull-the-lever" type boxes. He became interested in reports that several cities in the nation, seeking a more modern and useful emergency reporting method, were considering the use of the telephone rather than the telegraph type, and that Roanoke, Virginia, had been using a telephone system successfully since 1947. He followed closely the development of such a system for Miami, Florida, which became operative in 1953.

THE system consists of telephone instruments installed at strategic locations adjacent to traffic signals in waterproof boxes mounted on pedestals or posts. Each instrument is connected by a separate circuit directly to a switchboard located at fire department headquarters. These circuits are kept under continuous test, and visual trouble signals instantly alert the dispatcher if any individual box or circuit is out of order. If a box or circuit becomes inoperative, the rest of the system is not affected.

The moment a caller lifts the hand unit from the hook to report an emergency, a light flashes on the switchboard at fire headquarters indicating the location of the call box, and an audible signal operates until the dispatcher answers the call. The caller then can report the emergency and pinpoint the location. If, for any reason, the calling person does not or cannot give the exact location and details of the emergency, designation strips above the light instantly give the dispatcher the location of the box. Any number of calls from any number of boxes can be received simultaneously at the switchboard.

Among the advantages of Whitttier's new system are: (1) the ability of a person reporting a fire to give the exact location and description of a blaze, thereby enabling the fire department to dispatch the correct type and quantity of equipment directly to the scene in the shortest possible time; (2) although it still is possible to report a malicious false alarm, experience indicates that telephones keep this trouble to a minimum; (3) a telephone conversation with the dispatcher assures the person reporting a fire that the alarm actually has been recorded and that help is on the way.

Financial News and Comment

By OWEN ELY

High Lights of 1955 Electric Utility Statistics

THE Edison Electric Institute's *Statistical Bulletin* for the year 1955, issued a few weeks ago, furnishes data for an analytical study of 1955 operations of electrical utilities.

Last year total generating capacity reached 130,000,000 kilowatts (name-plate basis) of which the investor-owned utilities owned 87,000,000 kilowatts, public power agencies 27,000,000, and non-utility industries 16,000,000. The increase in capacity during 1955 approximated 12,000,000 kilowatts—about two-thirds contributed by investor-owned utilities and one-third by public power agencies. A major factor in the expansion was the completion of the large OVEC and TVA plants designed to serve the Atomic Energy Commission.

Generating capacity has two separate meanings—name-plate capacity, and actual capability. The figures given above were for name plate. On a capability basis the electric utility industry at the end of 1955 had nearly 120,000,000 kilowatts or about 5,500,000 more than name-plate capacity. On this basis and with a peak load of about 102,000,000 kilowatts the margin of reserve capacity was about 18 per cent, which is considered normal. In 1947 the reserve was only 6 per cent, and hence a portion of the postwar construction program had been devoted to improving the reserve. If, as anticipated, load requirements double in the next decade, (they increased over 150 per cent in the past decade), future installations should increase capacity a little over 7 per cent a year to maintain the present reserve margin.

REGARDING the controversial question of the amount of atomic energy which may become available over the next few years, the EEI *Bulletin* states that 17 nuclear power plants with an ultimate generating capacity of 1,300,000 kilowatts are in various stages of construction, planning, and design. Of these, one large plant should be in operation late next year, three others by 1960, and the remaining 13 by 1962 or earlier.

Of the 64,000,000 kilowatt new ca-

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pacity installed in the past decade, about 82 per cent was steam and 16 per cent hydro—the latter figure indicating that hydro construction is slowing down. It has been assumed by the public, perhaps, that federal expansion in the utility field has been almost entirely in water power. This is incorrect, for while the federal government and other public agencies installed about three times as much hydro capacity as investor-owned utilities in the postwar period, the federal government also installed nearly one-tenth of all new steam-generating facilities and municipalities about 5 per cent.

The institute estimates that in the coming decade some 95 to 112,000,000 kilowatts will be added by investor-owned electric utilities and 20,000,000 kilowatts by government-owned projects. "Captive" power plants owned by industrial companies, mines, railways, etc., are showing much less growth than the electric utility industry—in fact, capacity for this group declined last year, presumably due to retirement of some old plants and acquisition of the business by electric utilities.

HYDRO generation increased only 40 per cent in the past decade, while steam generation gained over 200 per cent; the percentage of hydro to total generation has dropped from 36 per cent to 21 per cent. Adverse water conditions were a factor in recent years. However, since potential economic water sites are becoming fewer, the importance of hydro may continue to decline, while atomic energy will gradually come into the picture.

Total generation of power by the industry in 1955 passed the half-trillion kilowatt-hour mark for the first time. Including nonutility power sources and net imports, the total reached 629 billion kilowatt-hours, an increase of 15 per cent over the previous year. Over one-quarter of the 1955 increase in sales may be attributed to the AEC. Use of electricity by the commission is expected to expand for perhaps two more years, after which it may level off.

While total sales of electricity increased 17 per cent in 1955, it was only necessary to generate 15.8 per cent more current to meet added requirements, due to greater efficiency in transmission and distribution.

FOR the first time the EEI *Bulletin* presents statistics for energy sales and revenues on two bases—total electric utility industry and investor-owned electric utilities. By deducting sales and revenue figures for the latter from the former, it is possible to derive corresponding figures for the public power agencies as a group (including co-ops). From these figures in turn, average revenues per kilowatt-hour can be worked out for the two groups as shown in table below.

Investor-owned utilities pay out nearly 24 per cent of revenues for taxes while publicly owned pay perhaps 2 per cent or a difference of about 22 per cent. Privately owned utilities have about 21 per cent of revenues remaining after operating

	Investor-owned Utilities	*Public Power Agencies*	*Total Industry*
Residential	2.76¢	2.32¢	2.64¢
Small Light & Power	2.55	2.04	2.47
Large Light & Power	1.06	.48	.91
Total Ultimate Customers*	1.80	1.22	1.67

*Including smaller classifications such as street lighting, etc.

PUBLIC UTILITIES SECURITIES OFFERED FOR SUBSCRIPTION AND/OR SALE
(000 omitted)

	January 1 to June 30, 1956					January 1 to June 30, 1955				
	Total	Electric Companies	Gas Companies	Telephone Companies	Other Companies	Total	Electric Companies	Gas Companies	Telephone Companies	Other Companies
Long-Term Debt										
Offered Publicly	$ 744,085	$467,500	$126,085	$140,000	$10,500	$ 671,507	$554,500	$ 50,507	$ 58,500	$ 8,000
Offered through Subscription	52,027	-	1,173	50,854	-	39,237	37,737	1,500	-	-
Offered Privately	210,582	24,000	129,715	35,000	21,867	262,700	39,650	183,450	32,300	7,300
Total	$1,006,694	$491,500	$256,973	$225,854	$32,367	$ 973,444	$631,887	$235,457	$ 90,800	$15,300
Preferred Stock										
Offered Publicly	$ 176,242	$117,265	$ 44,000	$ 14,977	-	$ 123,850	$ 56,825	$ 35,000	$ 26,400	$ 5,625
Offered through Subscription	5,066	-	5,066	-	-	23,243	23,243	-	-	-
Offered Privately	12,900	5,600	2,500	3,500	1,300	29,200	13,750	10,000	1,250	4,200
Total	$ 194,208	$122,865	$ 51,566	$ 18,477	$ 1,300	$ 176,293	$ 93,818	$ 45,000	$ 27,650	$ 9,825
Common Stock										
Offered Publicly	$ 40,505	$ 29,134	$ 1,851	$ 8,479	$ 1,041	$ 146,582*	$ 70,599	$ 61,803*	-	$ 6,180
Offered through Subscription	168,743	130,088	13,979	24,676	-	219,426	105,198	83,417	25,180	5,631
Total	$ 209,248	$159,222	$ 15,830	$ 33,155	$ 1,041	$ 366,008	$183,797	$145,220	$ 25,180	$11,811
Total Financing	$1,410,150	$773,587	$324,369	$277,486	$34,708	$1,515,745	$909,502	$425,677	$143,630	$36,936
SEGREGATION OF FINANCING - BY PURPOSE										
Total Refundings	$ 57,377	$ 4,026	$ 18,869	$ 34,482	-	$ 167,287	$124,348	$ 17,307	$ 25,632	-
Total Divestments	-	-	-	-	-	$ 66,919	$ 3,150	$ 60,589	-	$ 3,180
New Money										
Long-Term Debt	$ 967,825	$491,500	$238,104	$205,854	$32,367	$ 836,887	$521,887	$228,150	$ 71,550	$15,300
Preferred Stock	175,700	118,840	51,566	3,994	1,300	137,811	81,718	25,000	21,268	9,825
Common Stock	209,248	159,221	15,830	33,156	1,041	306,841	178,399	94,631	25,180	8,631
Total New Money	$1,352,773	$769,561	$305,500	$243,004	$34,708	$1,281,539	$782,004	$347,781	$117,998	$33,756
Total Financing	$1,410,150	$773,587	$324,369	$277,486	$34,708	$1,515,745	$909,502	$425,677	$143,630	$36,936
SEGREGATION OF FINANCING - BY TYPE										
Competitive Bidding	$ 781,090	$519,240	$111,350	$140,000	$10,500	$ 708,606	$629,812	$ 13,794	$ 57,000	$ 8,000
Negotiated Sales	$ 179,742†	$ 94,659	$ 60,586	$ 23,456†	$ 1,041	$ 232,855	$ 60,113	$133,037	$ 27,900	$11,805
Subscription										
Competitive Bidding	$ 44,499	$ 39,433	$ 5,066	-	-	-	-	-	-	-
Negotiated Sales	137,057	63,399	7,204	$ 66,454	-	$ 120,531	$ 94,513	$ 14,446	$ 7,981	$ 3,591
No Underwriting	44,280	27,256	7,948	9,076	-	161,375	71,664	70,472	17,199	2,040
Total Subscription	$ 225,836	$130,088	$ 20,218	$ 75,530	-	$ 281,906	$166,177	$ 84,918	$ 25,180	$ 5,631
Private Sales	$ 223,482	$ 29,600	$132,215	$ 38,500	$23,167	$ 292,378	$ 53,400	$193,928	$ 33,550	$11,500
Total Financing	$1,410,150	$773,587	$324,369	$277,486	$34,708	$1,515,745	$909,502	$425,677	$143,630	$36,936

* Includes $478,000 common stock sold privately.

† Includes $14,377,000 preferred stock not underwritten.

Ebasco Services Incorporated, Corporate Finance Department, July 9, 1956 - AJP

charges and taxes, to serve as return on capital. This has to provide about 6 per cent on invested capital, whereas publicly owned utilities probably need earn only about 3 per cent or less because of (a) low interest rates on tax-free bonds, (b) financing by 100 per cent debt, (c) government subsidies and favorable allocations of plant cost, and (d) the "preference" clause on cheap hydro power, etc. Thus public power revenues could theoretically be one-third lower for public power agencies (22 per cent plus 11 per cent). This is about what the average kilowatt-hour revenues show—a reduction from $1.80 to $1.22 or 32 per cent. But in residential rates (how about the "yardstick"?) public power rates are only 16 per cent under those of investor-owned utilities.

Considering the fact that nearly half of all power generated by public power agencies is hydro, while investor-owned utilities generate less than one-eighth of their output by hydro, it is surprising that there is not a greater difference in the average rate figures. Moreover, it seems generally recognized that rates for some of the large public power agencies such as Bonneville are now too low and must be increased sooner or later.

TURNING to the subject of fuel consumption, the EEI *Bulletin* indicates that fuel prices remained fairly steady in 1955, while Btu per kilowatt-hour dropped to 11,700 compared with 12,180 in 1954. Pounds of coal burned per kilowatt-hour were .955 pounds *versus* .990. Average use of electricity by residential customers continued to increase, reaching 2,751 kilowatt-hours per annum. The average residential rate for residential customers was 2.64 cents *versus* 2.69 cents in 1954. For all ultimate consumers average revenues per kilowatt-hour dropped from 1.77 cents to 1.67 cents, the sharpest decline in many years, due mainly to the sudden 9 per cent decline in the average industrial rate (previously unchanged for several years).

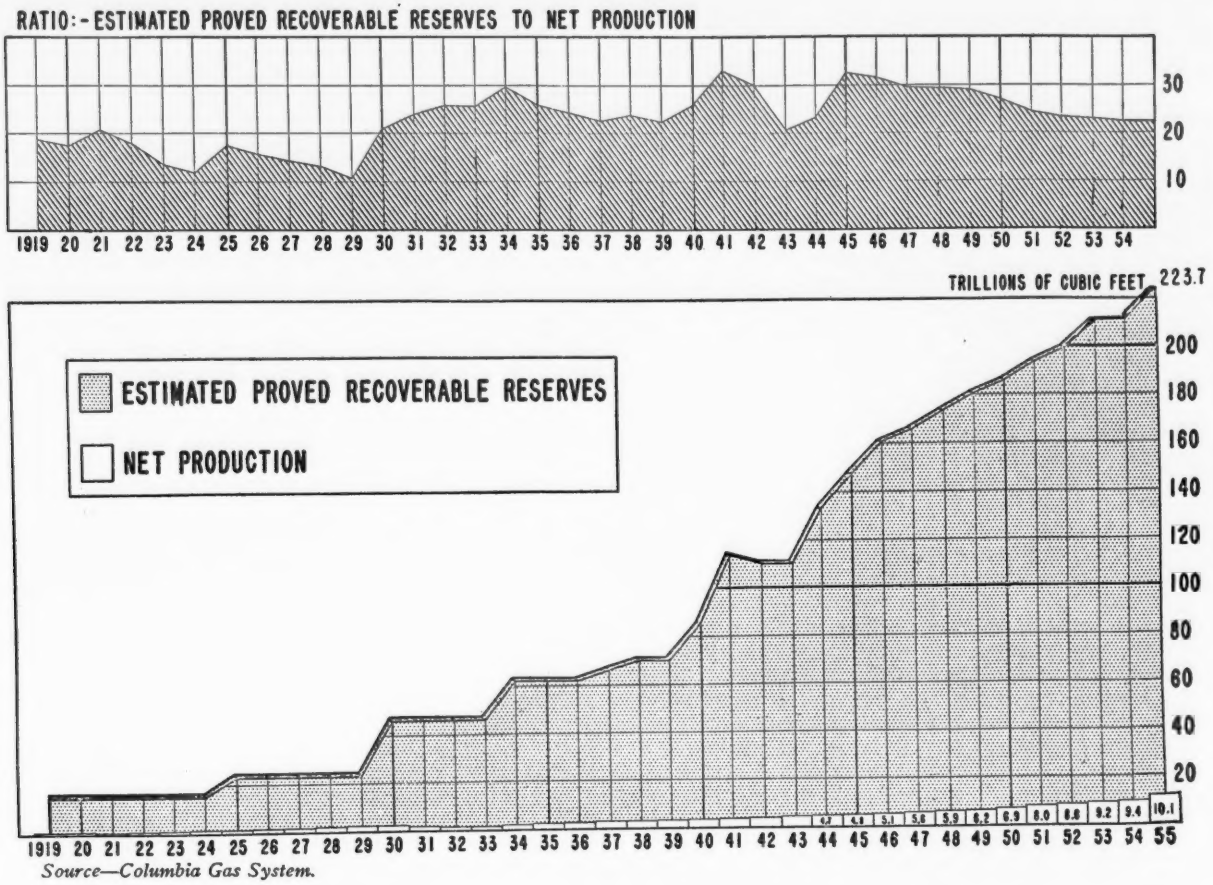
Construction expenditures last year were $2.7 billion for investor-owned electrical utilities, compared with over $2.8 billion in the two previous years. The decline was principally in generating facilities, possibly due to the Westinghouse strike. Taxes were 23.6 per cent of revenues *versus* 22.8 per cent in 1954. Net income in 1955 was $1,259,000,000, a gain of 10 per cent, while common dividend payments of $785 represented an increase of only 7 per cent; dividend pay-out was 71 per cent *versus* 73 per cent in the previous year.

American Tel. & Tel. Offers Valuable Stock Rights

AMERICAN TELEPHONE AND TELEGRAPH COMPANY on July 18th made an unusual announcement—that an offering of about 5,750,000 shares of common stock at $100 per share will be made to stockholders of record September 14th. The offering will be the largest ever made by an American corporation. Based on the recent price of 181 for American Telephone, the stock would sell ex rights at $173.64 and the rights would have a market value of $7.36. Prior to the financing the market will have to absorb a considerable number of shares created from conversion of a substantial portion of the $171,000,000 convertible debentures now outstanding, since holders of the latter will convert to obtain the rights.

Since 1913 or earlier, American Telephone and Telegraph has never sold common stock directly to the public, and since 1930 has not sold to its own stockholders directly. There were seven subscription

NATURAL GAS IN THE UNITED STATES



Source—Columbia Gas System.

offerings of stock during the period 1916 and 1930 and ten subscription offerings of convertible debentures during 1913-53. (None were issued between 1929 and 1941.) Thus in earlier years the two kinds of offerings were intermingled while since 1941 only convertible debentures have been offered to stockholders. The proposed new offering is therefore merely a return to the earlier method used during World War I and later, of alternating between stock and convertible debenture offerings. As a necessary step stockholders will be asked at a special meeting to be held September 7th to vote on an increase in the amount of authorized stock from 60,000,000 to 100,000,000 shares.

Stockholders have received a $9 dividend since 1922. The market values of rights offered during the postwar period have been approximately as follows:

1946	$2.02
1947	1.43
1949	1.17
1951	2.00
1952	2.21
1953	2.43
1955	3.45

The average value of these rights was $2.10, or $1.47 if averaged over each year of the 10-year period. Assuming sale of all rights, the cash added to the dividend would raise the average annual income to $10.47.

It may be surmised that the proposed October offering of extravaluable rights may be the management's answer to the agitation by certain stockholders for an increase in the cash dividend and/or a stock split. It had been suggested earlier that the question of a stock split might be placed on the voting agenda for the 1957 stockholders' meeting. Possibly the Bell management wants to forestall this issue and maintain the status quo, by offering a generous subscription privilege. The value of the new rights may be considered in several ways. If they are sold the extra income would be equivalent to payment of a $10 dividend for about seven years. If they are exercised the holder of ten shares bought at the current market price would have eleven shares costing $1,910 and yielding 5.2 per cent—a very good yield for a stock like telephone.

The company's reluctance to raise the $9 dividend seems to stem partly from tradition, and partly from a desire to increase the amount of earned surplus before undertaking either a dividend increase or a split in the stock. At the end of 1955 retained earnings per share amounted to only $19.99, hardly enough to carry the company comfortably through a long depression.

During the period 1946 to June, 1955, the Bell system obtained its huge construction funds of about $14 billion as follows:

Stock issues (including conversions of debentures and sales to employees)	38%
Bonds, loans, etc.	26
Depreciation and other internal cash	30
Reinvested earnings	6
Total	100%

Based on a compilation by the Department of Commerce, during this period all major corporations raised their aggregate funds for construction as follows: 6 per cent by stock issues, 19 per cent by debt financing, and 75 per cent through internal cash.

Due both to the huge expansion of the telephone business and the increase in the cost of new construction resulting from the decreased purchasing power of the dollar, Bell system's capital investment will soon be quadruple the 1945 total. This growth is continuing, and after utilizing funds from internal sources such as depreciation the Bell system companies must continue to raise an average of $100,000,-

000 of new money each month by the sale of securities.

Because the telephone business is more cyclical than the electric, due to the much heavier wage burden and the resulting inflexibility of expenses during a depression period, the Bell system management feels that it should have a system capital structure of about one-third debt and two-thirds common stock. (The amount of subsidiary preferred stock, about $18,000,000, is negligible.) It is estimated that currently the common stock equity is around 64 per cent.

In the past the amount of common stock has been increased rather steadily, rather than by a sudden 10 per cent increase such as now proposed, through the gradual conversion of debentures and the sale of stock to employees at bargain prices on an instalment basis. During the postwar period ending June 30, 1955, common stock value has been created as follows:

	Billion
Conversion of debentures	$3.0
Premium on stock	1.1
Employees' stock	.7
Other sources	.8
Total	$5.6

Convertible debenture financing has been on a rotating basis—before a new issue was offered, conversion of the remainder of the earlier issues has usually been forced by redeeming them. About 89 per cent of convertible debt added since the war has been converted to ownership capital.

American Telephone and Telegraph reports earnings on the basis of "average shares," which will soften the blow of the forthcoming 10 per cent dilution next fall. Another delaying factor will be the choice given shareholders of paying for the stock in a single payment or in two equal instalments—one due November 5th at the end of the subscription period and the other February 1, 1957.

RECENT FINANCIAL DATA ON GAS UTILITY STOCKS

Rev. (Mill.)			*7/24/56 Price About*	*Dividend Rate*	*Approx. Yield*	*Share Earnings* Current Period*	*% Increase*	*12 Mos. Ended*	*Price-Earns. Ratio*	*Div. Payout*	*Approx. Common Stock Equity*
		Pipelines									
$ 4	O	Alabama-Tenn. Nat. Gas	19	$ .80h	4.2%	$1.41	7%	Mar.	13.5	57%	37%
15	O	Commonwealth Nat. Gas	31	1.20	3.9	2.61	9	Dec.	11.9	46	45
16	O	E. Tenn. Nat. Gas	10	.60	6.0	.68	21	Mar.	14.7	88	18
48	S	Mississippi Riv. Fuel	35	1.40	4.0	2.06	10	Mar.	17.0	68	52
69	S	Southern Nat. Gas	37	1.80	4.9	2.70	68	Mar.	13.7	67	33
200	O	Tenn. Gas Trans.	31	1.40	4.5	1.83	14	Mar.	16.9	77	22
163	O	Texas East. Trans.	27	1.40	5.2	1.97	31	Dec.	13.7	71	23
71	O	Texas Gas Trans.	23	1.00	4.3	1.93	19	Mar.	11.9	52	27
75	O	Transcont. Gas P. L.	18	.90	5.0	1.21	17	Mar.	14.8	74	19
		Averages			4.7%				14.2	67%	
		Integrated Companies									
127	S	American Nat. Gas	64	$2.20	3.4%	$4.15	16%	Mar.	15.4	53%	35%
50	A	Arkansas-Louisiana Gas	20	1.00	5.0	1.30	182	Mar.	15.4	77	53
44	O	Colo. Interstate Gas	72	1.25	1.7	5.53	NC	Mar.	13.0	23	35
304	S	Columbia Gas System	16	.90	5.6	1.36	28	Mar.	11.8	66	44
8	O	Commonwealth Gas	7	(a)	4.0a	.26	D51	Dec.	—	—	72
10	A	Consol. Gas Util.	16	.90	5.6	1.62	69	Apr.	9.9	56	53
240	S	Consol. Nat. Gas	42	1.70	4.0	3.04	12	Mar.	13.8	56	70
178	S	El Paso Nat. Gas	56	2.00	3.6	3.72	101	Mar.	15.1	54	22
40	S	Equitable Gas	30	1.50	5.0	2.15	13	Mar.	14.0	70	32
15	O	Kansas-Nebr. Nat. Gas.	34	1.60	4.7	2.58	36	Mar.	13.2	62	32
88	S	Lone Star Gas	33	1.60	4.8	2.44	29	Mar.	13.5	66	39
23	S	Montana-Dakota Util.	27	1.00	3.7	1.48	10	Mar.	18.2	68	30
21	O	Mountain Fuel Supply	26	1.20	4.6	1.50	18	Dec.	17.3	80	59

72	S	National Fuel Gas	20	1.00	5.0	1.68	24	Mar.	11.8	60	58
108	S	Northern Nat. Gas.	48	2.20	4.6	3.68	21	Mar.	13.0	60	34
37	S	Oklahoma Nat. Gas	29	1.40	4.8	2.37	39	May	12.1	59	32
99	S	Panhandle E. P. L.	101	3.00	3.0	5.01	18	Dec.	20.2	60	32
11	O	Pennsylvania Gas	23	1.00	4.3	1.63	D10	Dec.	14.1	61	68
159	S	Peoples G. L. & Coke ...	163	8.00	4.9	12.77	23	Mar.	12.7	63	40
31	O	Southern Union Gas	25	1.12	4.5	1.69	28	Dec.	14.7	66	34
215	S	United Gas Corp.	32	1.50	4.7	2.08	4	Mar.	15.4	72	41
		Averages			4.5%				14.2	62%	
		Retail Distributors									
23	A	Alabama Gas	36	$1.50	4.2%	$2.23	20%	Mar.	16.4	67%	44%
38	O	Atlanta Gas Light	28	1.20	4.3	2.75	25	Mar.	10.2	44	40
5	O	Berkshire Gas	15	.80	5.3	.97	111	June	15.5	82	37
4	O	Bridgeport Gas	28	1.50	5.4	2.35	23	Mar.	11.9	64	44
4	O	Brockton-Taunton Gas ..	15	.70	4.7	.85	30	Dec.	17.6	82	36
55	S	Brooklyn Union Gas	35	2.00	5.7	2.90	12	Mar.	12.1	69	47
1	O	Cascade Nat. Gas	11	—	—	Def.	—	Dec.	—	—	41
33	O	Central El. & Gas	17	.90	5.3	1.58	14	Mar.	10.6	51	17
11	O	Central Indiana Gas	14	.80(b)	5.7	.96	D12	Mar.	14.6	83	64
5	O	Chattanooga Gas	7	.30	4.3	.48	71	May	14.6	63	43
61	O	Gas Service	26	1.36	5.2	2.50	37	June	10.4	54	38
6	O	Hartford Gas	37	2.00	5.4	2.50	15	Mar.	14.8	80	52
2	O	Haverhill Gas	19	1.20	6.3	1.66	21	Apr.	11.4	72	55
15	O	Houston Nat. Gas	25	1.00	4.0	1.82	D12	July	13.7	55	23
16	O	Indiana G. & Water	21	1.00	4.8	1.59	23	Apr.	13.1	63	47
6	A	Kings Co. Lighting	15	.90	6.0	1.21	4	June	12.5	74	28
40	S	Laclede Gas	16	.72	4.5	1.20	22	Mar.	13.3	60	36
4	O	Michigan Gas Utils.	18	1.00	5.6	1.31	5	Dec.	13.8	76	43
4	O	MidSouth Gas	12½	.15	1.2	.72	71	Dec.	17.4	21	34
37	O	Minneapolis Gas	25	1.30	5.2	1.87	13	Mar.	13.4	70	38
14	O	Mississippi Valley Gas ..	21	1.12(d)	5.3	1.86	15	Mar.	11.3	60	28
5	O	Mobile Gas Service	25	1.00	4.0	1.41	11	Mar.	17.7	71	33
7	O	New Haven Gas	30	1.60	5.3	2.39	7	Dec.	12.6	67	65
10	O	New Jersey Nat. Gas ...	25	1.20	4.8	2.11	40	Mar.	11.8	57	31
70	O	No. Illinois Gas	19	.80	4.2	1.47	24	May	12.9	54	49
8	O	North Penn Gas	15	1.00	6.7	.83	D33	Dec.	18.1	120	57
183	S	Pacific Lighting	39	2.00	5.1	2.84	10	Mar.	13.7	70	44
15	O	Pioneer Nat. Gas	27	1.32	4.9	1.89	10	Dec.	14.2	72	53
13	O	Portland Gas & Coke	35	1.00	2.9	2.04	49	Dec.	17.2	49	40
2	O	Portland Gas Light	11	.75	6.8	1.22	13	Dec.	9.0	61	25
8	A	Providence Gas	10	.56	5.6	.59	16	Dec.	16.9	95	64
3	A	Rio Grande Valley Gas ..	3	.15	5.0	.26	12	Dec.	11.5	58	63
3	O	So. Atlantic Gas	13	.80	6.1	.89	12	Dec.	14.6	90	35
9	O	South Jersey Gas	26	1.40	5.4	2.10	30	May	12.4	67	52
24	S	United Gas Improve. ...	41	2.00	4.9	2.33	10	Mar.	17.6	86	64
33	S	Wash. Gas Light	38	2.00	5.3	3.22	23	Mar.	11.8	62	42
8	O	Wash. Nat. Gas	16	.40	2.5	.43	D20	Mar.	—	93	67
6	O	Western Ky. Gas	13	.60	4.6	1.24	NC	Mar.	10.5	48	35
		Averages			4.9%				13.4	67%	

RECENT FINANCIAL DATA ON TELEPHONE, TRANSIT, AND WATER STOCKS

Rev. (Mill.)			*7/24/56 Price About*	*Divi. dend Rate*	*Approx. Yield*	*Share Earnings* Cur. rent Period*	*% In. crease*	*12 Mos. Ended*	*Price. Earns. Ratio*	*Div. Pay. out*	*Approx. Common Stock Equity*
		Communications Companies									
		Bell System									
$5,297	S	Amer. T. & T. (Cons.) ..	184	$9.00	4.9%	$13.28**	8%	May	13.8	68%	64%
245	A	Bell Tel. of Canada	48	2.00	4.2	2.43**	—	Dec.	19.8	82	63
40	O	Cin. & Sub. Bell Tel.	89	4.50	5.1	5.45	6	Dec.	16.3	83	100
187	A	Mountain Sts. T. & T. ..	129	6.60	5.1	8.80	17	Feb.	14.7	75	78
285	A	New England T. & T. ..	145	8.00	5.5	8.89	35	Mar.	16.3	90	60
715	S	Pacific T. & T.	141	7.00	5.0	9.42**	D4	May	15.0	74	58

89	O	So. New England Tel. ..	40	2.00	5.0	2.11	D5	Dec.	19.0	95	64
		Averages			5.0%				16.4	81%	
		Independents									
4	O	Anglo-Canadian Tel. ...	30	$ .60	2.0%	$1.70	7%	Dec.	17.6	35%	48%
33	O	British Columbia Tel. ..	46	2.00	4.3	3.28	21	Dec.	14.0	61	28
2	O	Calif. Interstate Tel. ...	13	.70	5.4	.99	2	Mar.	13.0	71	30
13	O	Calif. Water & Tel.	18	1.00	5.6	1.46	20	Dec.	12.3	68	42
14	O	Central Telephone	23	1.00	4.3	1.98	24	Mar.	11.6	51	25
3	O	Commonwealth Tel.	15	.80	5.3	1.31	27	Dec.	11.5	61	32
38	O	Continental Tel.	37	1.20	3.2	2.25	38	Mar.	16.4	53	23
3	O	Florida Telephone	19	.80	4.2	.88	10	Dec.	21.6	91	40
210	S	General Telephone	43	1.60	3.7	2.63	27	Dec.	16.3	61	34
5	O	Inter-Mountain Tel.	14	.80	5.7	.95	9	Dec.	14.7	84	55
19	S	Peninsular Tel.	40	1.80	4.5	2.40	14	Mar.	16.7	75	46
19	O	Rochester Tel.	20	1.00	5.0	1.45	48	Dec.	13.8	69	34
3	O	Southeastern Tel.	16	.90	5.6	1.36	43	Sept.	11.8	66	42
8	O	Southwestern Sts. Tel. ..	19	1.12	5.9	1.37	31	Dec.	13.9	82	42
28	O	United Utilities	23	1.20	5.2	1.70	12	Mar.	13.5	71	31
12	O	West. Coast Tel.	19	1.00	5.3	1.55	28	Mar.	12.3	65	43
242	S	Western Union Tel.	20	1.00	5.0	2.10	39	Dec.	9.5	48	85
		Averages			4.7%				14.1	65%	
		Transit Companies									
22	O	Baltimore Transit	13	$1.60	12.3%	$1.27	120%	Dec.	10.2	126%	40%
13	O	Cincinnati Transit	5	.30	6.0	.34	16	Dec.	14.7	88	43
9	O	Dallas Transit	6	.35	5.8	.57	D48	Dec.	10.5	61	51
31	S	Fifth Ave. Coach Lines .	28	2.00	7.1	2.85	D3	Dec.	9.8	70	100
225	S	Greyhound Corp.	15	1.00	6.7	1.18	D12	Dec.	12.7	85	52
21	O	Los Angeles Transit	15	1.40	9.3	.94	D5	Dec.	16.0	149	89
27	S	Nat. City Lines	23	2.00	8.7	2.74	D1	Dec.	8.4	73	93
13	O	Niagara Frontier Trans. .	8	.15	1.9	1.47	—	Dec.	5.4	10	78
70	O	Phila. Transit	15	.30	2.0	1.27	390	Dec.	11.8	24	42
6	O	Rochester Transit	5	.40	8.0	.43	D2	Dec.	11.6	93	40
23	O	St. Louis P. S.	13	1.40	10.8	.68	D15	Dec.	19.1	206	91
16	S	Twin City R. T.	17	1.80	10.6	Def.	—	Dec.	—	—	41
22	O	United Transit	6	.60	9.2	1.03	94	Dec.	5.8	53	48
		Averages			7.4%				11.3	86.5%	
		Water Companies									
		Holding Companies									
34	S	American Water Wks. ..	10	$ .50	5.0%	$1.05	21%	Mar.	9.5	48%	16%
		Operating Companies									
4	O	Bridgeport Hydraulic ...	30	$1.60	5.3%	$2.04	12%	Dec.	14.7	78%	57%
11	O	Calif. Water Service ...	42	2.20	5.2	2.80	18	May	15.0	79	29
3	O	Elizabethtown Water ...	38	1.00	2.6	3.01	NC	Apr.	12.6	33	56
9	S	Hackensack Water	46	2.00	4.3	3.60	10	Dec.	12.8	56	37
8	O	Indianapolis Water A ...	42	.80	1.9	3.42	27	Dec.	12.3	23	33
5	O	Jamaica Water	36	2.00	5.6	2.83	D5	Mar.	12.7	71	25
4	O	New Haven Water	59	3.00	5.1	3.32	D3	Dec.	17.8	90	63
2	O	Ohio Water Service	26	1.50	5.8	2.46	56	Mar.	10.6	61	38
7	O	Phila. & Sub. Water	32	.50(e)	1.6	2.20	11	Dec.	14.5	23	29
2	O	Plainfield Un. Water ...	65	3.00	4.6	5.47	37	Dec.	11.9	55	40
3	O	San Jose Water	48	2.00	4.2	3.41	9	May	14.1	59	43
9	O	Scranton-Springbrook ..	18	.90	5.0	1.38	6	Mar.	13.0	65	29
4	O	Southern Calif. Water ..	14	.80	5.7	1.08	27	Dec.	13.0	74	34
3	O	West Va. Water Serv. ..	28	1.40	5.0	1.71	31	June	16.5	82	17
		Averages			4.4%				13.7	61%	

A—American Stock Exchange. O—Over-counter or out-of-town exchange. S—New York Stock Exchange. *Earnings are calculated on present number of shares outstanding, except as otherwise indicated. **On average shares. (a)—Paid 4 per cent stock dividend. (b)—Paid 10 per cent stock dividend. (d)—Paid 25 per cent stock dividend. (e)—Also paid 5 per cent stock dividend. (h)—Paid 25 per cent stock dividend. NC—Not comparable. NA—Not available.

What Others Think

Natural Gas in Alberta

As gold was to California, so is natural gas to the Canadian province of Alberta. There can be little doubt but that the province stands on the threshold of a booming new era in which Americans as well as Canadians will share the benefits. Alberta gas is already flowing into Montana markets. Newly developed supplies of the Canadian fuel will soon be serving other American gas consumers in other parts of the United States.

Facts behind this picture of boom and build up in the Canadian province were recently presented by George W. Govier of the University of Alberta at a Chicago meeting of the general management conference of the American Gas Association. From them, it may be possible to draw some inferences and conclusions as to the future impact of Alberta gas on the American economy and the natural gas industry in particular. The over-all perspective described by the speaker would tend to indicate that supplies of gas may be available for export to the United States for some time to come, notwithstanding the mushrooming growth north of the border.

The speaker noted that the development of the Alberta oil and gas industry has been rapid since 1947. For many years, small industries have thrived on the low-cost fuel, while more recently large expansions have taken place in the petroleum refining and petrochemical industries. Approximately 40 per cent of Canada's petrochemical industry is now centered in Alberta with a total capital investment in excess of $120,000,000.

Policies of Alberta's social credit government, which under Premier William Aberhart came into power in 1935 on a platform of monetary reform, have become increasingly conservative in the past ten years or more, according to the speaker. He said that the government is today a staunch supporter of free enterprise, and, in the oil and gas business in particular, it has demonstrated a hard-headed, sound, businessman's approach to its problems.

To understand the full importance of this government's policies with regard to industry and the development of the province's mineral resources, it is only necessary to know that ownership of oil and gas minerals in Canada and in Alberta in particular is very much different from that in the United States, Mr. Govier remarked. The basic difference stems from an order-in-council passed by the Dominion government in 1887 which decreed that all land grants thereafter be grants of the surface only and that all minerals would be reserved to the Crown

in the right of the Dominion government.

Prior to this time, he said, lands retained by the Hudson's Bay Company and both homestead and railway land grants included all minerals except for gold and silver. As a result of this early order-in-council, the province of Alberta found itself in the happy position of being the owner of approximately 81 per cent of the mineral rights within its boundaries, when in 1930 these minerals were transferred from the Dominion to the provincial government. Mr. Govier stated that of over 163,000,000 acres in the province, the province owns the minerals to more than 132,000,000 acres, the railways to about 13,000,000 acres, the Hudson's Bay Company to nearly 2,500,000 acres, and other private owners to slightly over 500,000 acres.

The administration of the provincially owned minerals is the major responsibility of the provincial government Department of Mines and Minerals, the speaker continued. This extremely difficult task is to no small extent simplified by a uniform grid system of land survey used in the province which has in turn made possible the development of uniform regulations for the acquisition of oil and gas minerals by private industry.

ONLY under the most unusual conditions does the provincial government actually sell the minerals it owns, according to Mr. Govier. Instead the basic method of disposition is by 21-year lease renewable for further terms of twenty-one years if the lease is productive of oil or gas in commercial quantities. He said present regulations restrict the maximum area of a lease to eight or nine sections one mile square depending upon its shape. There is, however, no restriction placed upon the number of leases that one person or one company may acquire. The speaker stated that the basic rental for such a lease is at the annual rate of $1 per acre. Production from the leases is subject to the payment of a royalty, the maximum payable on oil being restricted during the first twenty-one years of the lease to 16⅔ per cent, while current regulations provide for a sliding scale of royalty from 5 to 16⅔ per cent based on monthly production. He presented other figures showing that liquid hydrocarbons and sulphur obtained through the processing of natural gas are subject to a royalty of 12½ per cent, while the royalty on natural gas itself is 15 per cent of the selling price, with a minimum of three-fourths cents per Mcf.

History discloses that in 1936, the Alberta government authorized the granting of prospecting permits to areas under which the provincial government retained the ownership of minerals. Later, according to Mr. Govier, the prospecting permits were changed to "reservations." Rules governing the granting of reservation areas have been changed from time to time but at present an area up to 100,000 acres may be held under reservation through the medium of short-term renewals for a period of two years upon payment of rentals totaling 30 cents per acre. The holder of a reservation may take out a lease of not more than 50 per cent of the total area, at any time before it is terminated, the speaker said.

AT the time of conversion, areas of not less than one mile in width surrounding each location or concentration of leases and certain other areas are withdrawn and declared to be Crown reserves. Mr. Govier pointed out that these areas along with certain other large blocks of lands specifically established by the government as Crown reserves in 1941 are handled somewhat differently. Normal

leases and reservations are granted on the basis of first come, first served. In the case of the Crown reserve lands, however, the right to acquire a reservation or the right to lease is given on the basis of competitive bidding and cash bonus. Some phenomenally large figures have been paid for the right to lease Crown reserves, the speaker asserted. A record figure cited was a price of $3,110,000 paid for the right to lease a quarter section in the Bonnie Glen field. The government received a total of $62,000,000 in Crown reserve cash bonuses in 1955.

Mr. Govier said that the establishment by the government of a policy of granting licenses of natural gas rights is a recent development, and one designed to encourage exploration and drilling for gas by private industry. These apply to the holder of a reservation who has discovered natural gas in it, and who may wish to hold a reservation on the gas from a specified zone without continuing to hold the full petroleum and natural gas rights. The natural gas license is, in effect, a continuation of a reservation restricted, however, to natural gas in a designated zone or zones. The fee for a license is $250, according to Mr. Govier's figures, and the rental is at the rate of five cents per acre payable every six months. A license may remain in force for a maximum period of three years. Before the termination of the license the licensee may apply to lease the natural gas rights, and may acquire under such rights an area of between six and ten sections, depending on the depth of the productive zone, he said. The annual rental for such a lease is ten cents per acre until such time as a market is available for the gas.

Aside from the administration of the provincial statutes which deal with the acquisition of petroleum and natural gas owned by the province, which is handled by the provincial Department of Mines and Minerals, there is an agency to handle functions primarily regulatory in nature.

According to the speaker, this is an administrative board, known as the Petroleum and Natural Gas Conservation Board, established under The Oil and Gas Resources Conservation Act. Chief function is to administer regulations concerning the drilling for, production, and conservation of oil and gas in the province, whether from government or private minerals. The speaker likened it to the Texas Railroad Commission and other state regulatory bodies.

He described its functions as follows:

> The board establishes the spacing pattern for all wells drilled in the province. . . . [It] also has authority to establish production allowables for gas wells. Allowables have not been set for all gas wells in the province, nor does the board intend doing this, except in cases where the possibility of reservoir damage or serious inequities as between adjacent mineral owners may exist. Until recently, those allowables which were set were established on the rule-of-thumb basis of 20 or 25 per cent of open flow. A recently adopted method of setting allowables, in cases where they are needed, fixes daily average production quotas based upon volumetric considerations in effect upon the estimated recoverable gas from beneath the spacing unit. Daily maximum rates are also set on the basis of deliverability testing. Both the daily average and daily maximum allowables are based upon the engineering factors involved, not upon the market demand for gas. While there is statutory provision for the allocation of production

allowables of gas wells on the basis of market demand, there has been no real need for such market proration so far.

Of considerable importance to the natural gas industry in Alberta is the gas conservation policy adopted by the board. The board prevents the production of gas from dry wells or condensate fields unless the gas itself is sold or put to effective use. In the case of gas produced unavoidably with oil at reasonable gas-oil ratios, the board tolerates a certain waste, particularly early in the life of a field. After a field has been reasonably delineated however, and if a conservation scheme could be instituted, even at a break-even basis on the part of the producers, the board may require the gathering, processing, and conservation of the produced gas. Such a requirement was recently imposed upon the producers at the Redwater field. On the other hand, there are several fields in the province where the economics of gas conservation is not sufficiently attractive to yield even a utility rate of return on the investment. In such cases, the board approves the production of gas to flare so long as it aids in the production of the oil.

MR. GOVIER went on to give a graphic presentation of the tremendous increase in drilling activity within Alberta since the discovery of the Leduc oil field in 1947 by Imperial Oil Limited. This showed that over the past two or three years some 800 to 1,200 development wells and 350-400 wildcat wells have been drilled each year. He explained that the great bulk of the development wells has been oil wells—this of course being due to the relatively strong market for Alberta oil on the one hand and to the lack of pipelines to large markets for gas on the other. As to the wildcats, he said that almost exactly one-third of those drilled over the past five or more years have resulted in discoveries of gas or oil. About 40 per cent of the successful wildcats have discovered oil, while 60 per cent have discovered gas. Of 100 wildcat wells, 67 were dry holes, 13 or 14 oil strikes, and 19 or 20 gas strikes, considerably better than the United States average. Average depths at present are about 5,300 feet for development wells and close to 6,000 feet for wildcat wells.

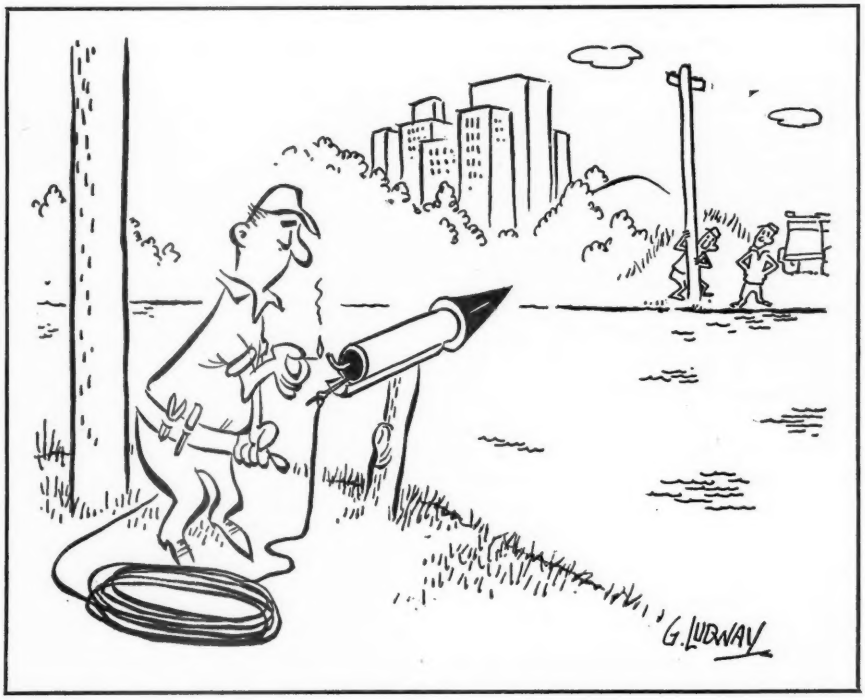
Despite the lack of pipeline outlets to suitable gas markets, Mr. Govier continued, substantial reserves of both dry and wet gas have been developed. Proven or established reserves have grown, according to Conservation Board figures, until the present remaining reserve, on a proven marketable basis, is approximately 16 trillion cubic feet—about the same as Kansas, which ranks fourth among U. S. gas sources, or equal to the entire proven reserves of the United States in 1929.

AN interesting figure, according to the speaker, is the recent Alberta average reserve established per wildcat well drilled of over 5 billion cubic feet, which easily supports the optimism of most geologists and engineers in future prospects.

At this point Mr. Govier remarked:

> Many of you may now be thinking, "Well, if Alberta has developed about 16 trillion cubic feet of gas without half trying, why doesn't she make arrangements to sell it outside the province and then, with markets and an exploration incentive established, prove up even more reserves?" Basically there are two reasons why we have been slow in taking such an obvious step.

One reason is that Alberta's gas is a



long way from large markets, and any scheme to supply such markets must be on a large scale and is necessarily a major and costly undertaking. The other, and really the more important factor now influencing the rate of market expansion for Alberta gas, is government policy—government policy at the provincial level, the dominion level, and, in the case of schemes involving the United States, at the United States federal level; *i.e.*, the Federal Power Commission. . . .

As a member of Alberta's Conservation Board, Mr. Govier felt he could comment only on the policy of the Alberta government and the board.

He stated that the provincial government in June, 1949, had held a special session of the legislature to consider a policy on "gas export." At this time, he said, it adopted the policy of favoring gas export so long as it could be sure that the present and future needs of the Albertan people, commercial, domestic, and industrial requirements, could be assured. This policy was incorporated in the Gas Resources Preservation Act. The act provides that no gas can be exported from the province without a permit issued by the Petroleum and Natural Gas Conservation Board, and it also stipulates that the board can only issue export permits for gas which, in its opinion, is surplus to the present and future requirements of the province. No sooner was the act passed than the board found itself in receipt of several competing applications for some permits.

On four different occasions, from 1950-54, the speaker declared, the board

issued decisions on these applications and in successive reports found the established reserves of gas to be 4.7, 6.8, 11.5, and 13.4 trillion cubic feet.

ESTIMATING the present and future requirements of Alberta on the basis of a 30-year forward look, Mr. Govier said the board found no surplus available until 1952, when it issued its first permit to Westcoast Transmission Company, Limited. By 1954, the surplus had grown to some 6.8 trillion cubic feet, and the board thereupon issued a permit to Trans-Canada Pipelines, Limited. In considering these applications, the board heard evidence on the magnitude of Alberta's reserves and on the present and future local requirements for gas. Some difficulties were encountered during this consideration, Mr. Govier said. On the reserve side, the excellent geological prospects and the outstanding record of wildcats indicated large future reserves, but these could not be taken as proven or established. And on the local requirement side, the statute required that it was the future which was to be considered. Conservative forecasts of future trends in Alberta gas consumption, presently averaging on per capita basis some 18 Mcf for commercial uses, some 26 Mcf for domestic, and just over 42 Mcf for industrial purposes, suggest that the figure will increase perhaps two and one-half fold by 1980. Mr. Govier said it was expected that Alberta would actually use nearly 5 trillion cubic feet in the next thirty years, necessitating the reservation of about 7 trillion cubic feet because of the poor local load factor.

Mr. Govier explained that, during hearings on the export application, the board did not insist on either full gas purchase or full gas sales contracts. But the policy has been revised, now requiring any applicant for an export permit to show contracts for the purchase of 80 to 90 per cent of his gas requirements.

MR. GOVIER characterized the present situation with regard to Alberta gas export commitments as follows:

> The presently proven remaining reserves in the province are now far in excess of those necessary to meet in every way the local requirements for thirty years into the future. Today's proven excess or surplus gas is just comfortably over that presently committed to export. Following are the details of the three important such commitments:
>
> 1. To Montana via Canadian Montana Pipeline Company, a total of some 350 billion cubic feet from specified fields in southern Alberta.
> 2. Via Westcoast Transmission Companys Limited, to southwestern British Columbia and the Pacific Northwest of your country, some 1.1 trillion cubic feet from specified fields in northern Alberta. (Westcoast will also take gas from fields in northern British Columbia.)
> 3. Via Trans-Canada Pipelines, Limited, to eastern Canadian and certain markets in north-central and northeastern United States, a future total of some 4.35 trillion cubic feet from many fields throughout southern and central Alberta.

The first of these commitments, the Montana one, is for a project now in full operation. The Westcoast project has overcome its many hurdles and is now under construction, with operation planned for late 1956 or early 1957. The Trans-Canada project is temporarily stalemated, the United States portion of it now being heard before the Federal Power Commission and the Canadian

portion awaiting results of those proceedings. Contracts have been signed for over 95 per cent of the gas supply.

In making the statement that the presently proven excess gas in Alberta is just nicely sufficient to meet present export commitments I include all the commitments I have mentioned, for the full period of the commitment and with full regard to the problems of deliverability. Moreover, I refer only to the gas reserves which the board has declared as presently proven or established.

THE speaker felt, that in any realistic consideration of the future it would be "clearly improper" to disregard the "outstanding prospects for the development of further gas reserves in the province." Alberta's 200,000 square miles underlain by sediments averaging over a mile deep have been penetrated by only about 3,000 wildcat wells—or one wildcat well for 65 square miles. Six times as many exploratory wells will be needed to reasonably explore the area, he asserted. "Suppose 15,000 more wildcats are drilled and even suppose the present figure of 5 billion cubic feet of gas reserve per wildcat drops to an average of 3—this would give another 45 trillion cubic feet of gas. Is this realistic? I think so—I think it is conservative."

As the speaker evaluated and compared the volume of sediments in Alberta with the total in the United States and the presently known oil and gas reserves of the United States, he saw indications that the ultimate gas reserves in Alberta will exceed 100 trillion cubic feet. His prediction was that 45 trillion cubic feet of new reserves would likely be developed by 1980, and would be assured, or almost so, by the drilling of 500-600 wildcat wells per year.

MR. GOVIER'S pertinent observation based on the forecasted growth of initial reserves to a round figure of 60 trillion cubic feet in 1980 subtracted from estimated local and export market requirements was that in 1980 there would be a remaining reserve of 35 trillion cubic feet—double the present figure. In the speaker's opinion, statistics tend to show available and committed export volumes of 400, 900, and 1,100 billion cubic feet per year by 1960, 1970, and 1980, respectively. This forecast assumes that reserves in Alberta will grow as predicted and that others besides Westcoast and Trans-Canada will wish to buy Alberta gas and that it will be bought about to the extent that it is available.

Mr. Govier continued:

> It is this future surplus gas that distributors in Canada and perhaps some of you here in the United States will be interested in. I believe that the forecasted volume available for export of 400 billion cubic feet per year by 1960, 900 by 1970, and over 1,100 by 1980 are realistic and probably conservative. . . . With 150 years of supply of proven gas based on current local requirements, Alberta is on the threshold of serving important export markets. The future will undoubtedly bring large additions to the present proven reserves. These new reserves will support increased export growing to a total of a trillion cubic feet per year in the 1970's.

Mr. Govier suggested that others might have a different guess than his own, but that all would probably agree that the situation in Alberta is worth watching.

The March of Events

NARUC Convention

SAN FRANCISCO was the site of the sixty-eighth annual convention of the National Association of Railroad and Utilities Commissioners last month. The feature of the first session was an address by the retiring president, Benjamin F. Feinberg, chairman of the New York Public Service Commission, who discussed regulatory problems in connection with nuclear reactors. Chairman Feinberg's speech and other addresses and reports to the San Francisco meeting will be reviewed in the next (August 30th) issue of PUBLIC UTILITIES FORTNIGHTLY.

Chairman Feinberg said that at this juncture it was impossible to make a reasonable guess as to what the nuclear power rates to the public would be. The cost factor is complicated by the fact that a nuclear reactor of the "breeder" type, which produces more energy than it uses, might be obsolescent by the time it is scheduled to go into operation. This, Chairman Feinberg said, posed such questions as "How are we going to treat rapid obsolescence? Is the consumer to pay the entire bill? Or should the stockholder share in the expense and, if so, to what extent?"

The NARUC elected John C. Hammer as its president. Hammer is chairman of the Tennessee Public Service Commission. The association chose Memphis, Tennessee, for its 1957 convention. Edward R. Thornton, New Hampshire Public Utilities Commission, was elected first vice president, and Charles H. Heltzel, of the Oregon Public Utilities Commissioner, second vice president.

Illinois

Dual Fuel Plan Approved

THE state commerce commission last month approved Northern Illinois Gas Company's dual fuel plan to provide space-heating service to customers on a part-time basis, effective July 30th. Northern Illinois Gas had filed the dual fuel plan with the commission early in July in a further effort to afford some measure of relief to customers awaiting gas for space heating.

Customers who desire to take advantage of the proposed plan and whose heating equipment can be modified would install duel fuel control equipment which automatically substitutes an alternate fuel for natural gas when the outside temperatures reaches a designated low point that the company indicates probably will be 32 degrees Fahrenheit.

Marvin Chandler, president of the utility, emphasized, however, that dual fuel service will provide only partial re-

lief to some of the customers on the company's space-heating waiting list, which now approximates 160,000 in Northern Illinois Gas territory.

Maryland

Steam Heat Boost Announced

THE Potomac Edison Company recently announced its intention to increase its steam heat rates in the Cumberland area beginning August 24th. In a letter to the state public service commission, the company said the rate boost was necessary to meet the cost of increased production and new equipment.

The company's president said $60,000 was recently spent for a new boiler and $9,000 for distribution line improvements. These, coupled with operation losses over the last several years, made the increase necessary, he said.

New York

Votes to Buy Third Avenue Line

STOCKHOLDERS of Fifth Avenue Coach Lines, Inc., voted overwhelmingly last month for the proposed acquisition of the bankrupt Third Avenue Transit Corporation. The vote was 397,829 in favor and 4,217 against.

Approval of Third Avenue Transit security holders and creditors was reported to be needed to put into motion the plan which will add 42 routes in the Bronx and six in Manhattan to Fifth Avenue's 24 Manhattan bus routes.

Agreed to by United States District Court Judge Edward J. Dimock and the Securities and Exchange Commission, the plan will result in one of the world's largest urban bus operations, with a total of more than 2,100 buses.

The Third Avenue line has been in reorganization under the Federal Bankruptcy Act since June 21, 1949.

Pennsylvania

Ordered to Reduce Rates

PENNSYLVANIA POWER & LIGHT COMPANY was recently directed by the state public utility commission to cut its power rates by $1,366,000 a year and make refunds of $1,920,000, plus interest, to 572,000 customers in 28 eastern counties. The commission ordered the rate reduction into effect August 1st and directed that the refunds be completed by December 1st.

In its order, which resulted from complaints filed by 23 industrial users, the commission found the rates to have been excessive since February 28, 1955. The industrial users contended that rate reductions posted by the utility in February, 1955, were not low enough, even though they saved consumers an estimated $273,000 a year.

The new schedules will reduce rates by $823,000 a year for residential and small commercial users and by $543,000 for large industrial and commercial customers.

The utility also was ordered by the commission to increase its rates to 3,560 customers in the Palmerton area. The commission said these customers had been receiving preferential rates since 1948, when Pennsylvania Power & Light acquired a local system there. The increase in this area is estimated at $10,000 a year.

The commission said the utility is en-

titled to only $97,369,587 a year in overall revenue and fixed its current income at $98,735,743.

Commission OK's Extension

THE state public utility commission recently authorized Pennsylvania Gas Company, Warren, to extend natural gas service to additional sections of Erie and Warren counties, a move that was said to pave the way for construction of transmission lines costing $1,705,000.

The new rights will permit the firm to provide service in the Waterford, Middleboro, Fairview, and Lake City areas, and those consumers within convenient line connection distance in Lebeouf, Waterford, McKean, Fairview, Girard, Green, Pittsfield, Freehold, and Sugar Grove townships in both counties.

The utility plans to build two sections of line. One will be approximately 23 miles of 10-inch transmission main from Union City across part of Erie county to a point about one mile south of Fairview. The other will be 15 miles of 8-inch pipe from the firm's present line near Wrightsville in Warren county to Jamestown, New York.

Texas

Co-op Status Clarified

AN opinion handed down by the state supreme court last month held that rural co-operatives can sell electricity to any resident of an annexed area when a city takes in some of the co-operative's customers.

The ruling was given in a case from the city of Gilmer, which annexed part of the area served by Upshur Rural Electric Co-operative. The city electric franchise was held by Southwestern Gas & Electric Company. Both the private utility and State Attorney General John Ben Shepperd contended the Upshur co-op could serve in the annexed area only customers which it had before annexation.

The state supreme court, however, upheld a decision by the Austin court of civil appeals that the co-operative could sell electricity to anybody in its original district, including the part annexed to the city. Fifty-four other co-operatives had intervened in the suit.

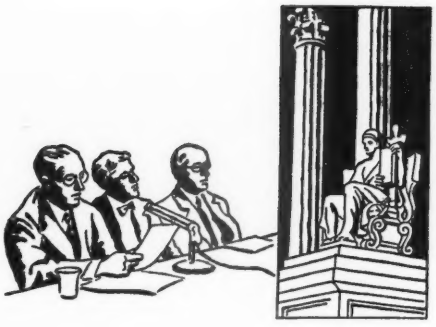
Washington

Eyes Lake Cle Elum

THE state power commission recently authorized its managing director to make application for use of water of Lake Cle Elum for steam plant development. The group directed J. Frank Ward of Seattle to ask the state supervisor of water resources for assignment of an "adequate supply of cooling water for any steam plant or plants whenever development of such a project is warranted."

"The future of the power supply of the area may well depend on nuclear power generation in twenty years or so," said Ward, "but we can't wait. The commission believes it must develop the more conventional steam-generating facilities in the very near future."

Any waters of Lake Cle Elum used would be returned immediately to prevent any interference with irrigation and other downstream use, the commission said. Ward said that surveys indicate use of the lake for steam plants would increase the water temperature very little. Water would be removed and returned at a deep part of the lake, he said.



Progress of Regulation

Trends and Topics

Denial of Service for Illegal Use

THE decision of the New Jersey supreme court (reviewed in PUBLIC UTILITIES FORTNIGHTLY, August 2, 1956, at p. 208) approving the denial of telephone service used to further illegal gambling is in harmony with numerous decisions. Public utility companies assist, to some extent, in law enforcement. Back in 1883, a federal court laid down the rule that telegraph and telephone companies could not be compelled to furnish their facilities to a bucket shop for the purpose of obtaining market quotations. This was in an action against the Western Union Telegraph Company (17 Fed 825). No departure from that general principle is noted in later decisions by courts and commissions, although disputes have arisen concerning its application.

Moreover, this is not a problem confined entirely to companies supplying telephone and telegraph service. In a recent case before the California commission, the Pacific Gas and Electric Company refused to supply electric service because of inadequate wiring (9 PUR3d 269). It contended that its employees would become liable for violation of city ordinances if a connection were made. The commission approved its denial of service.

A company has not only the power but the duty to withhold service from persons using it for unlawful purposes (79 PUR NS 149; 9 PUR3d 205). If a company knowingly permits the use of a telephone for illegal purposes, it may be accused of aiding and assisting in violation of the statute prohibiting such activities (36 PUR NS 513).

Request by Public Official As Basis

Questions, however, have been raised as to the justification for denial of service. Receipt of a request from police officers or other public officials has frequently been considered a satisfactory basis for concluding that service is used for illegal purposes and therefore should be denied, although the mere request by police officers has not always been recognized as complete justification.

The Indiana commission said that it took official notice of the acts of the general assembly and its statement of public policy with regard to denial of service upon notification by a law enforcement agency. Therefore, it dismissed a complaint against refusal of service when a telephone, according to advice from the prosecuting attorney, had been used in connection with a bail bond business (13 PUR3d 566).

The Florida supreme court decided that a telephone company was warranted in denying service to a news dealer supply company when notified to do so by the attorney general on the ground that it was being used for unlawful purposes. A state law making it unlawful for telephone companies to furnish private wire service for gambling purposes, the court held, was intended to prevent the use of private wire service in the dissemination of any information that might be used for gambling purposes (87 PUR NS 197; 90 PUR NS 389).

A federal court ruled that a telegraph company was justified in refusing to restore interstate wire service to transmit race track news between cities in eastern states and California cities where the company had been notified by California state officials that the service was being used illegally in connection with bookmaking of race track bets, which is illegal under California law (77 PUR NS 65). Similar decisions have been made in other cases; for example, in California (6 PUR3d 93; 8 PUR3d 45), the District of Columbia (80 PUR3d 76), Massachusetts (78 PUR NS 127; 8 PUR3d 277), and Missouri (79 PUR NS 61).

According to a federal court decision, a telephone company in determining whether it was justified in denying service could consider a warning received from the United States Attorney General's office that it would be made to face criminal proceedings if service were not discontinued (35 PUR NS 296).

A telephone company, according to the Massachusetts commission, is not required to inquire into the motives activating the police when it receives a notice of unlawful use (79 PUR NS 159). According to an Ohio decision, a telephone company which receives notification from a law enforcement officer that a telephone is being used for illegal purposes has no obligation to make an investigation but it has the duty to act forthwith (97 PUR NS 223). There was said to be a presumption that the public official had properly performed acts within the scope of his authority.

Company Responsibility Not Entirely Shifted

Although a telephone company may consult with the police regarding the advisability of discontinuing service because of suspected unlawful use, the responsibility for the determination to be made upon all the facts presented is, according to a New York court, with the company (9 PUR3d 205). In one case before a New York court, a telephone company was directed to resume service to a subscriber, whom it had served for many years, where the company had discontinued service unjustifiably at the request of the police department (71 PUR NS 63). The request was said to be arbitrary and

unjustified where the only unlawful use was made by an employee who was arrested for bookmaking over the telephone, and there was no evidence as to the subscriber's knowledge of this fact.

Although the Alabama supreme court recognized the right of a telephone company to deny service which would be used for illegal purposes, it declared that the questionable character or reputation of a subscriber is not justification for denying service, and a letter from a police commissioner ordering discontinuance of service did not constitute justification when the letter did not offer any reasonable basis for the conclusion as to illegal use (9 PUR3d 335). The commissioner of public safety, said the court, had no authority to issue an order directing discontinuance and the company was not obliged blindly to follow such an order.

According to the Michigan commission, law enforcement officers should state probable cause for belief that service is being used in furtherance of criminal activities (34 PUR NS 65). Although a telephone company must deny service after receiving a lawful notice from the police, said the Connecticut commission, the company is not obliged to assent to a manifestly false or malicious order (98 PUR NS 140).

A telephone company, according to a federal court, although required to refuse service for unlawful purposes (79 PUR NS 149), may not deprive a member of the public of his rights to service merely because it has received a notice from a law enforcement agency that the subscriber is using the service for illegal purposes. The company cannot by its tariff rules confer what amounts to judicial power upon a law enforcement officer by permitting discontinuance upon mere notice of unlawful use.

The Federal Communications Commission, in harmony with these views, disapproved a regulation providing that service would not be furnished if any law enforcement agency, acting within its jurisdiction, advised that such service was being used or would be used in violation of law or if the company received other evidence that such service was being used or would be so used. The commission said that the matter of providing or refusing service is one in which the company might not "insulate" itself from liability for its action by adopting such a regulation (92 PUR NS 1). The commission would not approve a rule-making advice from a law enforcement agency a conclusive presumption that the company had "probable cause" to believe that service was being used for unlawful purposes. The company could not accept such notice if it were aware of the fact that the information contained in the agency's notice was untrue (98 PUR NS 134).

Review of Current Cases

Telephone Rates Sharply Cut, Nickel Call Restored

SOUTHERN BELL TELEPHONE & TELEGRAPH COMPANY was ordered by the Louisiana commission to reduce intrastate revenues by $3,940,000. To effectuate

this reduction the commission directed that public pay station rates be restored to 5 cents for local calls and all intrastate toll rates be diminished by 20 per cent. The proceeding was instituted on an order to the company to show cause why its rates in the state should not be reduced, to which the company countered with a demand for a rate increase.

Rate Base Items Excluded

A test period of four months ending in October, 1955, was adopted at the company's instance, and an average net investment rate base was used. A substantial claim for plant under construction was excluded from the rate base in view of the fact that interest, taxes, and other overheads will be allowed as a part of the total cost when the construction work is completed and put in service. Furthermore, since a substantial part of the construction was designed for new customers, if it is to be presently included in the rate base, equity would require inclusion of the estimated additional revenue to be produced by such construction. Otherwise, existing customers would be forced to pay a return on property constructed for future subscribers, with the result that when these future users begin to receive service, the company would derive a double return on the cost of the new facilities.

The commission refused to make an allowance for materials and supplies and cash requirements, considering that the company held in accrued reserve for the payment of taxes an average monthly balance exceeding those claims. Besides, the company enjoyed advance revenues in excess of the working capital requirement.

Capital Structure

Southern Bell is a wholly owned subsidiary of American Telephone and Telegraph. During the test period Southern Bell's debt ratio averaged 21.3 per cent. Evidence showed that privately owned electric companies in the United States had debt ratios of about 50 per cent at the end of 1954, while natural gas companies' ratios were approximately 62 per cent, with both percentages on an upward trend. The electric and gas companies had preferred stock in their capital structures. Southern Bell had no preferred. Even twelve typical independent telephone companies, though relatively small, had a composite of 49 per cent in long-term debt and 13.6 per cent preferred stock at the end of 1954. Comparing telephone earnings and dividends with those of electric companies during the decade between 1930 and 1940, the commission concluded on the basis of risk and stability of earnings that the telephone industry, particularly Southern Bell, could safely carry as much long-term debt as the electric industry.

The commission called attention to the present "excessive" cost of capital obtained from the parent company and the heavy gain to the latter resulting from consolidation of income tax returns, all at the expense of Louisiana ratepayers. It was observed that for each $1 of dividends paid by Southern Bell, there must be $2.08 in revenue, not counting the 10 per cent federal excise tax. On the other hand, interest paid on debt capital is a deductible expense for tax purposes. Finding that the company's actual average debt ratio of 21.3 per cent was "imprudent and uneconomical," imposing an "unjust and unwarranted financial burden" on the subscribers, the commission reconstructed the capital structure on the basis of a 45 per cent debt ratio.

Current Cost of Capital

The testimony being in substantial

agreement on the cost of long-term debt capital, the commission found 3.35 per cent as the cost of incremental debt on the basis of the assumed debt ratio, and, considering the historical cost of the company's debt at slightly less than 3 per cent, a composite cost was calculated at 3.19 per cent.

Since Southern Bell's stock is held by the parent company, the commission was obliged to look to other sources in determining equity capital cost. The commission was of the opinion that Southern Bell's stock would rank on the open market with the best electric utility equity securities. During the past six years average yields on first-quality electric common declined from 5.80 per cent to 4.40 per cent in March, 1956. Nor is this decline a phenomenon of the electric industry alone. In determining the cost of equity capital, or adequate compensation for the investor, both dividends and surplus must be considered, for the investor views surplus, or retained earnings, as a cushion for continued dividends and as a prospect for higher dividends. The earnings-price ratio, which embraces these essential components, said the commission, constitutes a sound basis for determining the investor's appraisal of stock.

No allowance for cost of financing or market pressure was made, considering that Southern Bell sells its stock to the parent company at nominal expense and at par value. A study was presented of ten leading electric utilities with average earnings-price ratios of 6.18 per cent in 1955, and five Bell system operating companies averaging 5.84 per cent, besides similar ratios of other companies, all having declined from the 1954 level. In addition to these considerations, said the commission, attention must also be given to economic conditions generally, the company's past growth and future outlook in Louisiana, its financial history, technological developments in the telephone industry, and the company's protection against destructive competition.

The commission adopted an earnings-price ratio of 6.6 per cent for Southern Bell, noting that no effect was given to the parent company's tax status with respect to dividends received from the operating company. Assuming a pay-out ratio of 90 per cent (the company's actual pay-out ratio for the past ten years) and converting the 6.6 per cent earnings-price ratio into open market yields, with appropriate adjustment for savings from consolidated income tax returns, the commission found that Southern Bell's open market yield in 1955 would greatly exceed the yields from leading electric utilities.

Revenues and Rate of Return

Upon ascertaining the amount of revenues needed to service the assumed debt, pay reasonable dividends, provide for an adequate surplus, and otherwise successfully operate, the commission concluded that the company's revenues should be reduced by $3,940,000. The resultant rate of return would be 4.8 per cent, which would rise to 5.2 per cent if effect were given to the added profit inuring to the parent by reason of the consolidation of tax returns.

Other matters which arose in this case but which require further study will be considered in a subsequent proceeding. The commission denied an allowance for attrition, for want of evidence. A petition to reopen the record was dismissed on the ground that the evidence proposed to be submitted would effectually present a completely new case and make the instant proceeding obsolete. *Louisiana Pub. Service Commission v. Southern Bell Teleph. & Teleg. Co. No. 6706, June 30, 1956.*

System-wide Rates Approved for Telephone Company

BESIDES granting a rate increase to meet rising labor costs of a telephone company, the Colorado commission approved a revision of rate schedules on the basis of the company's system-wide operations. In a prior order the commission noted that existing rates were not uniform for comparable service in communities or exchanges of similar size. The company was therefore directed to submit revised schedules eliminating disparities.

One community served by the company complained that the revision provided for substantially increased rates for its inhabitants. It contended that such rates were discriminatory on the ground that they would produce excessive earnings on the value of the property located in the community. The commission, however, having long been on record as favoring system-wide rates for telephone companies, rejected this claim of discrimination. (The desirability of system-wide rates has been discussed by the commission in prior cases: Missouri Pub. Service Commission *v.* Southwestern Bell Teleph. Co., 57 PUR NS 257; Re Southwestern Bell Teleph. Co., 77 PUR NS 33.) Normally, it was noted, a company's books and records used for fixing rates are not kept by local exchanges, so that operating results at a particular exchange cannot be readily ascertained.

Another community complained that the company, in bargaining for a franchise, represented that specified rates would be applied in that area, while the revised schedules provided for somewhat higher rates. Finding that the proposed rates were fair, the commission declared that neither the community nor the company could, by bargaining for a franchise, establish rates for the future since that is a matter strictly within the province of the commission. *Re United Teleph. Co. of Missouri, Case No. 13,314, June 21, 1956.*

Court Upholds Exclusion of New Plant Added during Rate Hearings

THE Arkansas supreme court sustained the commission in denying a rate increase for Arkansas Power & Light. Computing a rate base in accordance with a 1944 order (55 PUR NS 129) prescribing use of the prudent investment theory and expressly authorizing inclusion of the average of construction work in progress, the company determined that its rate of return from existing rates was below the 6 per cent allowed in that order. It therefore sought an increase.

In denying the increase, the commission refused to follow the 1944 order and disallowed construction work in progress as a part of the rate base. The commission asserted that it would be improper to include plant under construction unless some provision were made for the inclusion of additional future revenues, or exclusion of expenses to be saved, as a result of the addition of new plant, particularly where interest is capitalized. With this substantial item of approximately $25,000,000 disallowed, the commission found that existing rates produced a rate of return of 5.985 per cent, which was considered adequate.

Effect of Former Rate Order

The company maintained that the commission was without authority to change the 1944 order without first giving notice.

While the company denied notice, the court decided that ample notice was in fact given.

The supreme court noted that by orders entered in 1954 the commission suspended proposed rate changes in order that an investigation could be made. In addition, interveners had petitioned for review of all prior orders with respect to rate base and rate of return for the company. When the company sought an increase in rates, said the court, it was clearly the duty of the commission to determine whether the company was entitled to an increase in order to earn a fair return on its capital. The commission was not bound by the 1944 order and upon proper notice, which was given, was free to make changes in it. Nor were any constitutional rights of the company invaded by the commission's action.

Test Period and New Plant

The court ruled that the company could not complain of the test period used (twelve months ending March 31, 1954) since the commission merely adopted the period selected by the company. However, evidence was introduced showing that $20,000,000 of construction work in progress passed to plant account during the hearings, within two months after the end of the test period. The company asked the commission to consider this item in the rate base determination, but the request was rejected with the observation that "some point of time must be fixed for the purpose of submitting pertinent facts and data." The court sustained the commission's position.

Upon this issue one judge sharply dissented. He would have sent the case back to the commission for consideration of the $20,000,000 of new plant. The result of the commission's failure to consider this item, said the judge, was to fix a return for the foreseeable future, ignoring $20,000,000 of invested capital used and useful at the time of the commission's order. *Arkansas Power & Light Co. v. Arkansas Pub. Service Commission et al. 289 SW 2d 668.*

Telephone Rate Increase Approved after Changes In Rate Base and Operating Results

A TELEPHONE company, which for twenty-nine years had operated without a rate increase in the face of rising costs and increased investment, finally asked the New Jersey commission to approve a rate increase. New rates calculated to produce a rate of return of 6 per cent on an original cost rate base were authorized.

Rate Base Changes

The commission made a number of changes in the company's rate base and operating results calculations, having the effect of reducing the required additional revenue as proposed in the application. The proffered year-end rate base was rejected in favor of an average rate base since the exhibits relating to operating results were based on the average number of telephones in use.

The commission disallowed a substantial item of new plant which the company intended to install. Testimony showed that the contemplated addition, not having yet been ordered, could not be installed for more than a year. It was therefore disallowed, though an allowance was made for "normal net additions" during the test year. A working capital claim which included amounts normally

provided by investors was appropriately reduced.

Operating Income and Expense Items

In view of the recent addition of dial equipment and the prospective acquisition of new customers, the company satisfactorily showed that a 10 per cent increase in operating revenues could be expected. But without showing any direct relationship, the company sought to add 10 per cent to expenses in connection with the increased revenues. The commission denied this claim, noting that maintenance, operation, and tax expenses for 1955 declined despite a 9 per cent increase in revenues. Furthermore, savings in labor costs could be anticipated from the operation of the new dial equipment.

Depending upon improvement in its financial condition, the company proposed to grant a wage increase and included the prospective cost in operating expenses for the 1956 test year. Observing that there was no indication that the company was or would be required to pay the increase, the commission refused to consider a mere expression of a proposal to increase wages as authority for a substantial charge to expenses.

Depreciation, computed at 5 per cent of book cost of plant, was revised by the commission to reflect regular percentage depreciation charges to the several classifications of plant and equipment. Though the company made no provision for rate case expenses, the commission allowed an amount for such expenses amortized over a period of five years. Finally, an item of rentals derived from incidental use of property, which was made a part of the rate base, was included in the commission's calculation of return. *Re Hillsborough & Montgomery Teleph. Co. Docket No. 9213, July 5, 1956.*

Exercise of Eminent Domain Power to Acquire Land For Gas Storage Purposes Approved

A COMMISSION finding that a gas company should be authorized to exercise the power of eminent domain to acquire subsurface rock formations for storage was upheld by the Missouri supreme court.

About 25,000 applications of home owners desiring gas for heating were in the company's files. Because of the limited supply on hand, service had been delayed and refused, while the company sought ways and means to obtain a larger supply of gas. The cost of installing additional pipelines was shown to be prohibitive.

The company had finally come up with a solution, and proposed storing surplus gas not needed during the summer months and drawing on that supply in the winter. The only drawback was the refusal of the owner of the ideal site to negotiate for the sale of underground storage space. The company sought and obtained authorization from the state public service commission to exercise its power of eminent domain.

The sole issue to be determined by the commission in such a case, said the court, was whether it would be in the public interest to grant the right of condemnation. The contention that there was no shortage of fuel in the area was untenable, notwithstanding a sufficient amount of coal and oil to heat all the homes, since thousands of people desired but could not obtain gas.

Having made a conscientious attempt to supply the demand, and having failed

to contract privately for the storage space, the applicable statute required commission approval of condemnation. And from the evidence presented, the commission was justified in finding that the exercise was in the public interest. *Collins (Collins Bros. Oil Co.) v. Missouri Pub. Service Commission, No. 45179, July 9, 1956.*

Judicial Review Jurisdiction

GENERALLY affirming a judgment setting aside a commission order which denied a railroad authority to discontinue a station agency, the Indiana supreme court ruled that a requirement contained in the lower court judgment directing the railroad to discontinue the agency should be deleted. This was not because it constituted an attempt to substitute judicial for administrative opinion upon the question of discontinuing the agency, but because it was mere surplusage. *Indiana Pub. Service Commission v. Chicago, Indianapolis & Louisville R. Co. 132 NE2d 698.*

On petition to rehear, the court observed that the purpose of a judicial review of an administrative order is not to decide the matter on the merits for the administrative body but rather solely to determine whether the order was outside the jurisdiction of that body. *Indiana Pub. Service Commission v. Chicago, Indianapolis & Louisville R. Co. 134 NE2d 53.*

New FCC Depreciation Rates and Higher Wages Compel Additional Rate Increase

THE New York commission granted an additional increase in rates of the New York Telephone Company upon a showing of increased costs subsequent to its decision reported in 11 PUR3d 320. The company's claim was based upon a net investment rate base with a 6 per cent return, without going into the question of reproduction cost, which has been the subject of a controversy in court.

The Federal Communications Commission had authorized a new schedule of depreciation rates which would add to the annual expense and the company had agreed to wage increases. The commission approved the rate increase after rejecting claims that the company had a tendency to underestimate earnings, that a somewhat higher than 6 per cent rate of return earned on interstate business ought to be utilized to reduce the proposed tariff increase, that a going rate of 6 per cent return could be achieved with a smaller rate increase, and that 6 per cent was probably higher than necessary if criticisms of the company's capital structure were considered. *Re New York Teleph. Co. Case 17352, July 2, 1956.*

High Franchise Tax Ordered Shown as Surcharge On Customers' Bills

A NEWLY formed gas company obtained authority from the Colorado commission to construct facilities and distribute natural gas to the city of Cortez and surrounding areas. The company introduced satisfactory evidence of construction costs and showed franchise authority as well as a pipeline supply contract. Prospective studies relating to customers, revenues, and expenses, all

projected over a period of five years, were also presented. A financing program was to be developed later and submitted for approval.

A Cortez ordinance imposed a franchise tax of 2 per cent for the first year of operations, 4 per cent for the second year, and 5 per cent for the third year upon the company's gross revenues from both city customers and those in surrounding areas. The commission, however, refused to allow this tax to be collected from consumers outside the city. As to them, there could be no justification on the part of the city for imposing such a tax, since the company would operate in the surrounding areas under the commission's certificate and not under the city's franchise.

While franchise taxes are legitimate charges for the use of city streets and alleys, said the commission, there must be some reasonable relationship between the tax and the service which the city gives. When they become disproportionately high, they make the utility, in effect, a tax-collecting agency. In order that consumers might be fully informed of the amount and nature of the franchise tax, the commission ordered the company to show it on customers' bills as a surcharge. *Re Cortez Nat. Gas Co., Inc. Application No. 14270, Decision No. 46025, June 20, 1956.*

Accounting for Accelerated Depreciation

THE Missouri commission prescribed an accounting procedure to be used by an electric company in connection with accelerated depreciation under § 167 of the Internal Revenue Code of 1954. The procedure was established, however, as in prior orders, for accounting purposes only.

The company was directed to account on its books for properties subject to accelerated depreciation in the same manner as for other properties and to accrue depreciation for the former at rates consistent with those for like property not so depreciated. During the years when accelerated depreciation allowances would be greater than allowances permitted under regular methods, the company was required to charge the resulting tax deferral to "Provision for Deferred Federal Income Taxes" and to credit correspondingly "Reserve for Deferred Income Taxes." Beginning with the year when accelerated depreciation allowances would be less than under normal methods, the resulting tax increase would be charged to "Reserve for Deferred Income Taxes" until the reserve was exhausted. Correspondingly, a credit would be entered to "Portion of Current Federal Income Taxes Deferred in Prior Years." *Re Empire Dist. Electric Co. Case No. 13,376, June 20, 1956.*

Applicant Entitled to Subpoena Information From Interveners

REVERSING a presiding examiner, the Federal Power Commission ruled that Texas Eastern Transmission Corporation, a certificate applicant, was entitled to subpoenas to compel interveners to produce documents and records which the applicant believed would disprove their allegations of interest in the proceeding and possible aggrievement in the event a certificate were issued. Though the examiner did not purport to pass upon the relevancy of the evidence sought to be produced, he declared the request to be premature until "affirmative presentation in opposition to Texas Eastern is adduced on the record, or at least it becomes cer-

tain that it will come into the record."

Prematurity and relevancy of evidence needed to disprove allegations of interest of the interveners, the commission indicated, are dependent upon each other, for the burden of establishing the facts necessary to determine the interest as well as the aggrievement of the interveners is not upon them.

However, it is to be presumed that assertions in a petition to intervene are bona fide and that substantiating evidence can be presented.

Therefore, failure by opposing parties or the commission staff to disprove such assertions will foreclose an applicant from showing the true interest of interveners and preclude a finding that their interest does not in fact exist. Interveners should not thus be allowed, by withholding information, to prevent the development of this aspect of the record.

Rather than issue the subpoenas itself, the commission thought it proper to direct the examiner to issue them. *Re Texas Eastern Transmission Corp. et al. Docket Nos. G-2503, G-9784—G-9787, June 20, 1956.*

Right of Way to Be Obtained by Company Instead of Prospective Customers

THE California commission, in directing an electric company to make a reasonable effort to serve prospective customers located within its service area, commented on the company's assertion that if a right of way was required to be obtained, the action should be instituted by the complainants and not by the company.

In support of its position, the company cited a statute which authorized individuals desiring service to start a condemnation action. There were several property owners involved, said the court, and any electrical facilities installed would become the property and the responsibility of the company.

In such a situation, the utility, and not any of the prospective customers, should bring any condemnation action which might be necessary to provide service to the complainants. *Johnson v. Southern California Edison Co. Decision No. 52931, Case No. 5665, April 24, 1956.*

Allocation on Incremental Basis Criticized

SERIOUS questions of allocation were posed when the Massachusetts commission investigated the propriety of transit fare increases. This was usually the case, said the commission, with utilities operating under two different jurisdictions.

The company had allocated miscellaneous items of expense arbitrarily, 10 per cent to interstate and 90 per cent to local expense. The company contended that all of these expenses should really be charged to local operations since there would be no reduction therein if interstate work was discontinued.

The commission could not accede to this position, and noted that it had very often criticized attempts to allocate expense on an incremental basis such as proposed here.

When it becomes impossible to make any other allocation, said the commission, it would not agree that a purely arbitrary figure should be used, but would insist that such expenses be assigned on a basis comparable to other expenses of as nearly

similar a nature as possible. Miscellaneous items of expense in this case were assigned on a revenue basis.

The commission commented on the impracticability of stating a return on investment in the company situation because of the necessity of allocating capital accounts which did not lend themselves to such treatment. However, it was clear that the operating revenues, which would produce a ratio of upwards of 98 per cent, which were estimated to flow from the application of the proposed increased rates, would not result in a profit which was above the bare subsistence level. The increased fares were approved. *Re Massachusetts Northeastern Transp. Co. DPU 11671, May 4, 1956.*

Circuitous Interstate Route No Bar To State Regulation

THE Virginia commission ruled that a carrier transporting property between points wholly within the state, though over a circuitous route crossing the state line, was as a matter of law operating intrastate.

While the carrier held an interstate certificate, it had no authority from the Virginia commission to conduct intrastate service. A fine was imposed for illegal operation.

The carrier maintained that it could lawfully transport goods between points in Virginia so long as it carried them out of the state and back again. It asserted, for instance, the right to carry goods from Roanoke to Wytheville, a distance of 80 miles by direct highway, without a state certificate, so long as it hauls them by a route passing through Bluefield, West Virginia, a distance of 160 miles.

Whether the carrier escapes state regulation, said the commission, depends upon whether the movement is bona fide, but this criterion is not in turn dependent upon the carrier's mere state of mind. The test is whether an ordinarily prudent carrier not restrained by regulation would use a particular route. When a carrier follows a circuitous route for the purpose of escaping state regulation, it does not by that means escape such regulation. *Commonwealth of Virginia ex rel. State Corporation Commission v. Service Storage & Transfer Co., Inc. Case No. 13074, July 9, 1956.*

Interruptible and Firm Natural Gas Service to Cement Plant Approved

THE California commission granted a certificate of public convenience and necessity to a gas company and authorized the company to supply interruptible and firm natural gas to a cement plant in accordance with a contract. The commission found that a sufficient quantity of such gas should be available reasonably to supply the estimated future fuel requirements of the plant.

The company was directed to continue to base its fuel oil clause on posted prices in the San Francisco Bay area, as long as a 5-cent differential with the Los Angeles Basin posted price was maintained.

As to the level of the rates, the commission was aware that the proposed price of the gas was lower than a reasonable competitive level based on the probable delivered cost of fuel oil at the plant site.

Because of the increasing costs of supplying firm gas service, the commission placed the parties on notice that it might desire to increase this rate in the near future, or revise the fuel escalator clause.

With regard to the 4 per cent interest rate, the commission realized that the applicant did not earn 6 per cent on each extension but might earn a higher rate on some and a lower rate on others. The commission did not favor a "utility acting as a banker," nor did it favor a contract term longer than five years. Since the applicant, however, was apparently convinced that this was the best arrangement it could make to obtain the new load and its benefits without burdening existing customers, the contract was approved.

The commission stated its preference that utilities extend interruptible service in accordance with their filed rules without resorting to the "exceptional cases" clause.

However, in this instance, after careful weighing of all the facts, the commission decided not to let these considerations stand in the way of contract authorization.

In entering into the contract, said the commission, the cement plant took the risk that interruptible gas might not be available for as long a time as, and to the extent, forecast by the company. Another risk taken was that the smog situation might become so bad in the San Francisco, Los Angeles, or other metropolitan centers that the commission might be required, in the public interest, to reduce the available gas supplies in areas not particularly subject to smog. *Re Pacific Gas & E. Co. Decision No. 53049, Application No. 37635, May 8, 1956.*

"Grandfather" Certificate Binding on Commission

A TEXAS court of appeals, affirming a lower court decision, ruled that the state commission could not reduce the authority contained in a carrier certificate issued under a "grandfather" statute, even though the carrier permit upon which the certificate was based conferred greater authority, by reason of a clerical error, than the commission had actually granted in its order.

The "grandfather" statute required the commission, upon application, to issue the certificate to "include all the rights and privileges" granted in the permit, which was "in force and effect" on a specified day. Since the commission acted under the legislative grant of authority in issuing the "grandfather" certificate, that certificate became valid and binding on the commission. It could not thereafter review the certificate and correct the error derived from the original permit.

One justice dissented, saying that the original permit was dependent for its existence upon the commission's order authorizing it, and that since the commission is a quasi-judicial body, it should have authority to correct its records. *Texas R. Commission et al. v. Airline Vans, 289 SW2d 824.*

Common and Contract Carrier Distinction Overruled

A DISTINCTION made by the Maryland commission between common carriers and contract carriers under a grandfather statute was abolished upon further proceedings before that body pursuant to a remand order issued by a reviewing court.

The statute directed the commission to

issue to all qualifying carriers permits "to operate as carriers of inflammable or combustible liquids."

In its original order, the Maryland commission distinguished between common carriers and contract carriers, issuing permits of the one type to some carriers and permits of the second type to other applicants. The order was appealed and subsequently remanded.

Upon further hearing the commission determined that its authority under the statute was limited to the issuance of only one type of permit, that is, simply a permit "to operate as a carrier of inflammable or combustible liquids." The legislative omission to distinguish between the terms "common" and "contract" carriers, the commission noted, indicated that no distinction in the type of permit to be issued was intended. Recipients of permits were allowed, however, to indicate at the time of filing rates whether or not they would hold out as common carriers serving the general public. *Re Permits to Operate as Carriers of Inflammable or Combustible Liquids, Case No. 5364, Order No. 52340, July 12, 1956.*

Owner of Water Well Not a Public Utility

THE Missouri commission held that the owner of a well, who was supplying residents located in his area with water, was not a public utility subject to regulation.

The owner never intended or held himself out to serve water to the general public or devote his property to public use.

The owner had dealt by contract with each neighbor who sought the opportunity of piping water out of his well. Allowing his neighbors, who asked it, the privilege of drawing water from the well by the use of their own pipes, said the commission, was no more a devotion of the well to public use than if the owner had allowed them to carry the water away in their own buckets or cans. *Re Bonham, Case No. 13,224, May 16, 1956.*

Other Recent Rulings

Telephone Rate Increases. Allowing for increased expenses incurred by two telephone companies in providing new facilities, the North Carolina commission in separate opinions authorized rate increases sufficient to produce a rate of return of 6 per cent in the one case and a rate ranging between 5.72 and 5.82 per cent in the other case, both computed on fair value rate bases. *Re Hickory Teleph. Co. Docket No. P-27, Sub 6, June 13, 1956; Re Lilesville Teleph. Co. Docket No. P-33, Sub 2, June 14, 1956.*

Return for Water Company. A rate of return of 6 per cent was authorized by the North Carolina commission for a water company on a fair value rate base, original cost less depreciation being considered as fair value in view of the bad state of repair of the properties. *Re East Biltmore Water Co. Docket No. W-5, Sub 4, June 6, 1956.*

Freight Rates Rise with Costs. The Ohio commission granted to railroads operating in Ohio a 6 per cent intrastate

freight rate increase (equal to an increase authorized by the ICC for interstate service) to offset rising costs, the rate of return ranging between 4.05 and 5.19 per cent on net investment. *Re Railroad Freight Rates and Charges, No. 26,037, June 8, 1956.*

Maintenance of Pipes. The Wisconsin commission authorized a water company to amend its operating rules and practices to provide for maintenance and replacement of pipes between main and curb stops. *Re City of Racine, 2-U-4560, March 20, 1956.*

Test Period for Water Rates. A proposed water rate increase based on a three months' test period was denied by the Connecticut commission, but a temporary increase thought to be sufficient to afford a small net return was authorized pending presentation of experience data for a twelve months' period upon which to predicate permanent rates. *Re Broad Brook Co. Docket No. 9300, July 9, 1956.*

Conditional Rate Increase. In order to provide for increased labor costs occasioned by the federal minimum wage law amendment, the Missouri commission granted a telephone company a rate increase, though it was conditioned upon the installation of circuit improvements between important exchanges operated by the company. *Re Doniphan Teleph. Co. Case No. 13,323, June 18, 1956*

Rates to Offset Wages Only. The Ohio commission, although approving a telephone rate increase in order to offset wage increases under the federal Wage-Hour Law, granted an amount less than that proposed by the company where the company's proposed rates overcompensated for the increased wage cost and would have resulted in a return of 6.29 per cent, whereas prior to the increased wage expenditure the company had been earning a return of 6.12 per cent. *Re West Ohio Teleph. Co. No. 26,024, May 3, 1956.*

Emergency Telephone Rate Increase. The Ohio commission granted an emergency rate increase to a telephone company whose application for permanent relief was still pending where existing rates had not resulted in sufficient earnings to attract capital and continuance of such a situation would have resulted in injury to the business and failure to fulfill obligations to the public. *Re Chillicothe Teleph. Co. No. 26,075, May 3, 1956.*

Allocation of Cost Unnecessary. The Washington commission held that a railroad seeking to justify the reasonableness of a new rate on a single commodity was no longer required to make a calculation of operating expenses attributable solely to the transportation of that commodity where the determination of exact cost was impracticable or impossible. *Washington Pub. Service Commission v. North Pacific Coast Freight Bureau, Cause No. T-8917, April 20, 1956.*

Telephone Territory Relinquished. Upon the failure of a telephone company over a period of years to exhibit any effort to provide service to outlying rural areas within its certificated territory, the Missouri commission treated such areas as uncertificated and directed other companies to serve them. *Re Bray et al. Case No. 13,357, July 3, 1956.*

Water Plant Sale at Loss. A company was permitted by the New Mexico commission to sell to a municipality, at a price below its value, a water plant isolated from an otherwise interconnected system and

being operated at a deficit, it appearing that considerable tax savings could be effected by municipal operation of the plant; however, the company was not allowed to amortize its loss out of operating revenues since that would adversely affect other customers of its system. *Re Southwestern Public Service Co. Case No. 468, July 5, 1956.*

Sale of Electric Plant. The New Mexico commission authorized an electric company to sell an electric plant to a cooperative at an agreed price substantially above either original cost less depreciation or appraised reproduction cost new less depreciation, including going concern value, in view of the fact that the plant was isolated from the seller's otherwise interconnected system and could probably be more economically operated by the purchaser. *Re Southwestern Public Service Co. Case No. 469, July 5, 1956.*

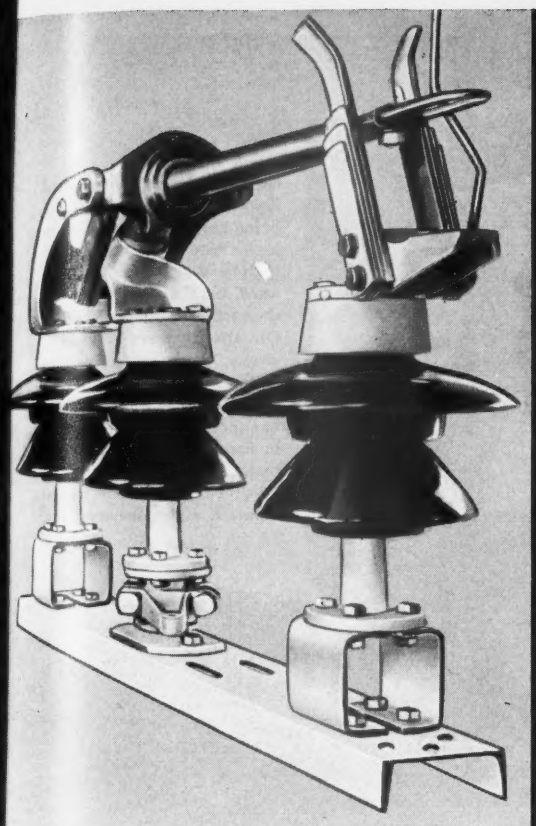
Depreciation Reserve Not Reduced. The Missouri commission refused to reduce a water company's recorded depreciation reserve in determining the original cost rate base, notwithstanding that a staff calculation was smaller in amount, since ratepayers had provided, through rates, the actual amount recorded on the company's books and a reduction would decrease the net rate base and require them to provide that amount of depreciation a second time. *Missouri Pub. Service Commission v. Raytown Water Co. Case No. 13,026, April 5, 1956.*

Service Denial for Lack of Deposit. The Missouri commission held that a water company which had made an extension without first receiving the prescribed deposit or advance prior to construction could not validly refuse to serve the customer until the deposit was made, since the greatest right the company had was a cause of action in a court of law to recover the amount due for such deposit or advance. *Kieselbach (Kieselbach Construction Co.) v. Capital City Water Co. Case No. 13,361, April 17, 1956.*

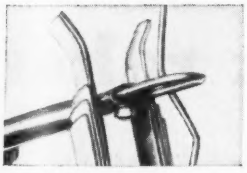
Zone Areas Unreasonable. A gas company was directed by the Wisconsin commission to discontinue present zones for rate application and to substitute therefor uniform rates applicable to the entire service area where the zone areas had been developed when the entire system was dependent upon manufactured gas but the company was presently in the process of substituting natural gas for coke oven gas. *Re Milwaukee Gas Light Co. 2-U-4365, May 18, 1956.*

Gas System Certificate. The Missouri commission granted a final certificate to a gas company, authorizing it to construct, operate, and maintain a high-pressure connecting pipeline and a gas distribution system for supplying service to certain municipalities, where the company had obtained a satisfactory gas supply, necessary franchises and permits, and was in a sound financial condition to service the public convenience and necessity. *Re Missouri Pub. Service Co. Case No. 12,374, April 3, 1956.*

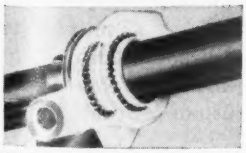
Construction of Freight Tariff. The New York court of appeals held that a motor freight carrier tariff which provided for a higher rate for interior loading did not authorize such rate in a situation where the loading platform was sheltered from the weather by being recessed partly beneath a portion of the warehouse. *Bianchi v. Sears, Roebuck & Co. 1 NY2d 63, 133 NE2d 699.*



Original or 'similar'— which do you prefer?



Delta-Star MK-40 Switches feature maximum contact efficiency and safety, with minimum current interchange surfaces.



Blade mechanism of MK-40 Switches has only three moving parts, yet develops enormous rotating operating leverage.

When you consider high voltage switches, one stands out because of its original performance-proved features that seem to be appearing in other switches. The standout is Delta-Star's MK-40.

Appearance to the contrary, *Delta-Star MK-40 Switches alone offer a combination of unequalled advantages originated by Delta-Star.* They feature sturdiest possible construction and large, rugged sealed-type ball bearing blade actuating mechanism for assured long service. They have a minimum number of moving parts and minimum current interchange surfaces—for efficiency and ease of operation. Contact pressure-applying springs carry no current, and offer large deflection to maintain uniform high pressure contact over extended periods of use. The fully controlled blade has high pressure silver-to-copper contacts at both ends. Contacts are fully visible for inspection.

Similarities help prove the exceptional value of the original. That certainly applies to Delta-Star MK-40 Switches—in all ratings—400 to 5000 amperes and 7.5 to 380 kv. Keep the MK-40 as your standard of comparison.

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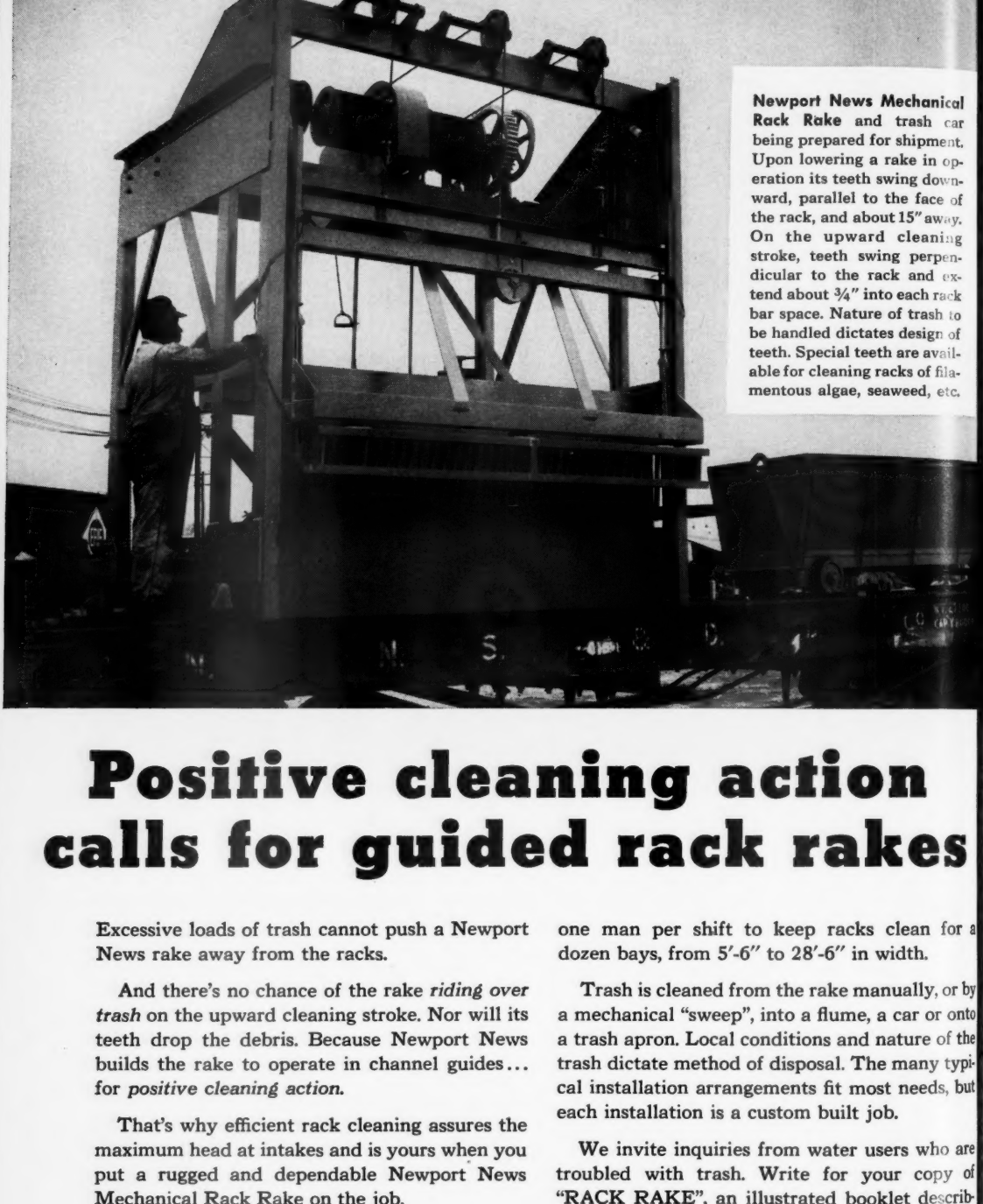

Newport News Mechanical Rack Rake and trash car being prepared for shipment. Upon lowering a rake in operation its teeth swing downward, parallel to the face of the rack, and about 15" away. On the upward cleaning stroke, teeth swing perpendicular to the rack and extend about ¾" into each rack bar space. Nature of trash to be handled dictates design of teeth. Special teeth are available for cleaning racks of filamentous algae, seaweed, etc.

Positive cleaning action calls for guided rack rakes

Excessive loads of trash cannot push a Newport News rake away from the racks.

And there's no chance of the rake *riding over trash* on the upward cleaning stroke. Nor will its teeth drop the debris. Because Newport News builds the rake to operate in channel guides... for *positive cleaning action.*

That's why efficient rack cleaning assures the maximum head at intakes and is yours when you put a rugged and dependable Newport News Mechanical Rack Rake on the job.

Maximum width of a single rake is determined by design of the forebay. Where a single bay is extremely wide, intermediate guides are sometimes installed to reduce width of the rake. Such installation is relatively inexpensive.

A power-operated Newport News Mechanical Rack Rake, under ordinary conditions, enables one man per shift to keep racks clean for a dozen bays, from 5'-6" to 28'-6" in width.

Trash is cleaned from the rake manually, or by a mechanical "sweep", into a flume, a car or onto a trash apron. Local conditions and nature of the trash dictate method of disposal. The many typical installation arrangements fit most needs, but each installation is a custom built job.

We invite inquiries from water users who are troubled with trash. Write for your copy of "RACK RAKE", an illustrated booklet describing the operation and advantages of the Newport News Mechanical Rack Rake.

Newport News
Shipbuilding and Dry Dock Company
Newport News, Virginia

Industrial Progress

Paso Electric Co. Plans $45 Million, 3-Year Expansion

45,000,000 three-year expansion ram for El Paso Electric Com- was announced recently by W. V. k, vice president in charge of ations.

ans call for addition of two 50,- kilowatt generating units in April, , construction of 115 miles of -voltage transmission lines and ities by June, 1958, and addition ne generating unit of 80,000-kilo- capacity by late 1959.

he new facilities, Mr. Holik said, more than double current capacity he system of 163,500 kilowatts.

he company also announced that New Mexico Public Service Com- ion had authorized it to build a 00,000 extension of its facilities olloman Air Development Center, Mexico.

he company plans to build a 000-volt line 75 miles from El to the air center and will extend milar capacity branch line 40 miles from Oro Grande to White Sands ving Ground, N. Mex. Contracts for delivery of electricity by July, , to both areas.

G-E Issues New Bulletin On esidential Outdoor Lighting

IRES, Cables and Cords for Res- tial Outdoor Lighting" is the sub- of a new booklet issued by Gen- Electric's Wire and Cable De- tment. The publication lists only cable products used in this type wiring and is designed to give the trical contractor the information needs without the necessity of king through complete catalogs for different wires, cables and cords. he booklet contains application rmation, specification data and il- trations of all of the products listed. ublication number is 19-296, and it is available without charge from Bridgeport, Connecticut.

Bulletin Outlines Services and Facilities of Electrical Testing Laboratories

TO ENABLE executives, engineers and others in industry and government to evaluate its capabilities, a new 72-page bulletin covering its services and facilities has just been published by the Electrical Testing Laboratories, Inc.

This new 8-1/2 in. x 11 in. bulletin contains more than 70 photographs and covers typical measurements and determinations made on hundreds of products and materials. In addition, it catalogs laboratory equipment available for limitless assignments in the fields of testing, applied research, and engineering analysis. This information is subdivided into the areas of chemical, electrical, electronic, mechanical and physical, and photometric, radiometric, and colorimetric testing. Similar information is given on spectroscopy, photomicrography, environmental, near infrared and ultraviolet testing.

As indicated in the bulletin, ETL serves a broad cross-section of industry and government. The company is continually adding new instruments and apparatus as called for by advancing science and technology.

Also covered in the bulletin is information on such special services as in-plant checks of instruments, test sets and apparatus; audits of testing and quality control procedure; audits of specification compliance procedure; and inspection and witness testing of wire, cable, transformers, generators, etc. Additional services covered include: qualification and reliability testing to government specifications; court testimony; and product certification.

The professional and confidential nature of its services, as well as the development of the 60-year-old Company to an employee-owned organization having its own 8-story, 100,000 sq. ft. building, also is summarized. Copies of the new bulletin may be obtained from Electrical Testing Laboratories, Inc., Two East End avenue, New York 21, New York.

Porter Purchases Electric Service Manufacturing

ELECTRIC Service Manufacturing Co., Philadelphia, Pa., was acquired by H. K. Porter Company, Inc. recently, according to an announcement by T. M. Evans, Porter's president. Electric Service manufactures electrical equipment for the utility and transportation industries and for heavy industrial plants. Mr. Evans stated that Mr. R. Kreinberg, president of Electric Service, and others of the management staff, will continue with the new Porter unit.

Appalachian Electric Power Company To Use Two-State Microwave System

APPALACHIAN Electric Power Company will soon be using an eight-station microwave system to connect its main offices in Roanoke, Virginia, and Charleston, West Virginia. Receipt of the contract to supply this equipment was recently announced by Leonard G. Walker, Marketing Manager of the microwave and industrial products section of Motorola's Communications and Electronics Division.

The proposed microwave system is one of the first steps in a five-year program planned by the utility company to meet the demand for economical, dependable communication. The new system which spans 145 miles of

(*Continued on page* 26)

mountainous country is designed to provide ten channels of communication for both voice and teletype. One of the channels will be used to connect the PBX systems at the two main offices. As the communications grow, the system can be expanded to twenty-four full voice channels.

Although this is the first use of microwave for Appalachian Electric Power Company, its parent company, American Gas and Electric Service Corporation, has had a Motorola microwave system in operation since 1954. In extensive tests conducted on this system, the microwave was found to provide 99.98 per cent dependability.

The Appalachian microwave system will span some of the most rugged terrain in that part of the country. Most of the installations will be made on mountain tops or ridges. Repeaters will be installed at Coal Fork, Lick Knob, Flat Top, Butt Mountain and Poor Mountain.

Jet-Tray Deaerator

COCHRANE Publication 4651 describes a deaerator design that eliminates tubular vent condensers without impairing efficient purging of noncondensible gases. This type deaerator handles the widest range of operating conditions and provides maximum effective scrubbing contact between steam and water, thus assuring highly efficient oxygen removal. Copies may be obtained from the Cochrane Corporation, 17th Street below Allegheny, Philadelphia 32, Pa.

New Jersey Utility Orders Westinghouse Power Equipment

THE Public Service Electric & Gas Company of New Jersey has ordered two 275,000-kilowatt turbine-generators, complete with associated power transformers, switchgear, controls, and power house auxiliary motors, from the Westinghouse Electric Corporation.

Representing one of the largest orders for power plant equipment ever placed with a single manufacturer, this equipment will be installed in a new generating plant to be known as the Bergen generating station.

Located in Ridgefield, N. J., the new station will serve the power n of northeastern New Jersey, and boost the company's total genera capacity by more than 20 per cen

The large boiler feed pumps i new units will be driven from generator shafts — a feature un for units of this size. Both mach have been designed to save consi able floor space in the new statio

The new power plant is expecte be in operation in 1958.

New Type FB-12 High Spee D-C Circuit Breaker

I-T-E CIRCUIT Breaker Comp announces the development of a current limiting high speed D-C ci breaker operable at 1000 volts 1200 amperes continuous. Its prim applications will be for protectio generators, and traction or dri motors; also for feeder breakers in multiple pole assemblies, for a protection.

The FB-12 was designed for tremely fast tripping and interrup of fault currents. It will interrup

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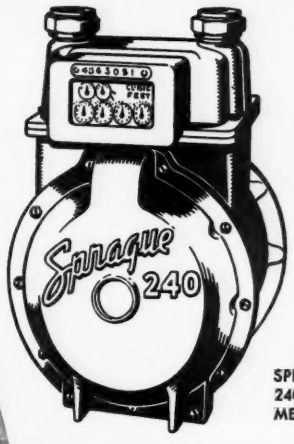

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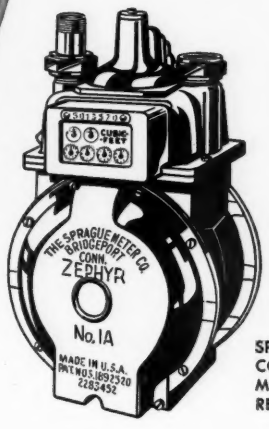

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INDUSTRIAL PROGRESS
(Continued)

a total of .012 seconds, and limit rent magnitude in .004 seco Breaker can be set for high sp tripping on either forward or rev current.

It is built in single and multiple assemblies, each with its own i vidual closing motor. It can be w for individual pole reclosing or a matic reclosing.

Twin 500 KW Mobile Generat Go To Venezuela

TWO mobile generators permane housed in tractor-trailer units this country recently on a preced setting trip for South America.

The 500 kw generators, capable furnishing the normal power need a town of 2,500 people when combi are the first purchased for use Venezuela. They were enginee and produced by the White Di Engine Division of the White Mo Company.

Both sets will be used by the C poracion Venezolana De Fome (Venezuela Development Corpo tion) as replacement power for ar where power lines and systems being re-routed and expanded.

General Manager William Burr of White Diesel Engine Division s the units are the result of several ye of research on mobile power pla and "were designed in cooperat with officials of the Venezuelan fi

"We consider this shipment a h binger and a start. Many Latin Am ican nations are rapidly expand their industry. The result is a n for more electric power as fast possible, and that includes mo power."

Assembly line production has b established at the big Springfield pl of the White Diesel Engine Divis to provide any quantity of the u required.

G-E Establishing Computer Laboratory at Menlo Park, Ca

FIRST step in a long range progr for expanding advanced-engineeri facilities of the General Electric Co pany in the industrial computer fi was announced recently with the tablishment of a computer laborat at Menlo Park, California.

H. R. Oldfield, Jr., general mana of the Company's Industrial Co puter Section, Syracuse, N. Y., s the new laboratory will be one of important engineering centers of section. It will be known as

(Continued on page 30)

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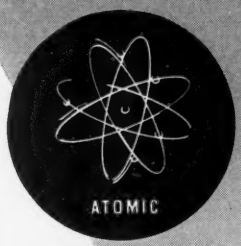

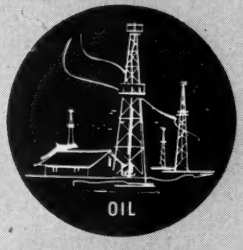

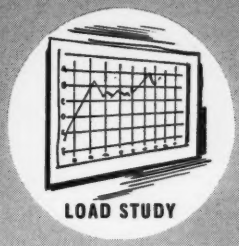

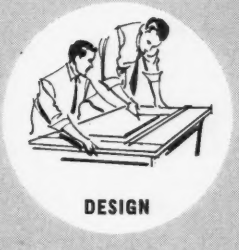

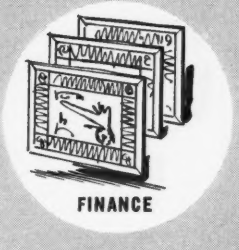

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descriptive booklet,
"Pioneering New Horizons"

ERMA Systems Laboratory. Headquarters for the new laboratory will be temporarily located in rented facilities at the Stanford Research Institute, Menlo Park, until permanent arrangements are completed.

According to Mr. Oldfield, about 15 scientists and engineers will begin work at the new laboratory immediately. He said that "a several hundred per cent increase in laboratory personnel is expected by the end of the year."

General Electric's Industrial Computer Section is now leasing approximately 8,000 square feet of floor space from Stanford Research Institute. Mr. Oldfield said the space "will be doubled later."

Concurrently with Mr. Oldfield's announcement of the laboratory, Kenneth R. Geiser, manager of engineering for the section, named George Jacobi, of Schenectady, N. Y., as manager of the laboratory. Mr. Jacobi will be headquartered at the new laboratory.

According to Mr. Oldfield, engineering work at the new laboratory will initially be devoted entirely to the development of the ERMA data-processing system. ERMA, or Electronic Recording Machine Accounting, is the electronic computer system developed for the Bank of America by the Stanford Research Institute.

Under an agreement announced in April, General Electric's Industrial Computer Section will refine and manufacture ERMA electronic computers for the Bank's long-range multimillion-dollar computer program.

At the conclusion of the ERMA program, about three years hence, Mr. Oldfield explained, the new laboratory will broaden its development activities to include a wide variety of allied electronic computer problems. He said the ERMA Systems Laboratory will work closely with the company's Microwave Laboratory, Palo Alto, Calif., "in exploiting new components and techniques to advance the electronic computer art."

Johns-Manville Issues Folder On Plastic Couplings

"NEW Johns-Mansville Plastic Couplings," is the title of an illustrated, 4-page folder which presents the time saving and money saving advantages of these couplings for Transite Ducts used in telephone conduit lines. The on-the-job photographs show installations in various sections of the country. Also shown are some of the various methods of installing and positioning Transite Conduit and Korduct which J-M Plastic Couplings make possible.

Copies of "New Johns-Mansville Plastic Couplings" are available from Johns-Mansville, 22 East 40th Street, New York 16, New York.

New Kuhlman Load Center Transformer Bulletin

A NEW twelve page bulletin (No. CS-1000) issued by the Kuhlman Electric Co. contains engineering ... weights and dimensions on Kuhlm... complete line of Load Center Tr... formers. The bulletin covers const... tion features on liquid-filled ... dry-type units for either indoo... outdoor installation with illustrat... and drawings on typical applicati... It also gives descriptions on stan... accessories, ratings available, and... types of core and coil assemblies ... fered.

Copies may be obtained from K... man Electric Company, Adverti... Department, Bay City, Michigan.

Bell System Uses 80,000 Trucks and Cars

MAINTAINING America's life l... of communications requires the c... bined might of 80,000 motor tru... and cars in the service of 20 Bell T... phone System operating compan... according to an illustrated article ... the current issue of *Internati... Trail* magazine.

An account in the nationally ... tributed International Harvester C... pany publication reviews activities ... this, the world's largest commer... motor vehicle fleet. The article o... inated with F. K. Glynn, New Y... automotive engineer for Ameri... Telephone and Telegraph Compa... who directs the development, desi... maintenance, and other technical ... pects of A.T.&T. rolling equipmen...

Water Needs of Carbon-Blac... Industry Increasing Rapidly

ALTHOUGH the American carb... black industry uses only enough wa... to supply a city the size of Troy, N. ... this use is vital to our present e... nomic system, Secretary of the In... rior Fred A. Seaton said in announ... ing the release of a U. S. Geologi... Survey report on the use of water ... making carbon black.

The use of water to make carb... black is increasing at a greater r... than is production because of t... trend to replace contact plants that u... natural gas with furnace plants th... use oil. Furnace plants use more th... three times as much water as do co... tact plants.

In 1941, five-sixths of the country... carbon black was produced by t... contact method which involves bur... ing natural gas in contact with st... plates so that carbon is deposited ... the metal just as carbon may be d... posited on cold glass or metal in...

(*Continued on page 32*)

candle flame. By 1953, about three-quarters of the carbon black was made by the furnace method in which oil is partly burned in a furnace. Water introduced into the burning gases results in formation of tiny particles of carbon as the gas is cooled.

During 1953 the industry used about 29 million gallons of water per day, more than half of which was for electric power production and purposes not directly related to carbon black production.

The report on "Water Requirements of the Carbon-Black Industry" was prepared by H. L. Conklin of the Geological Survey in consultation with the Water and Sewerage Industry and Utilities Division, Business and Defense Services Administration, Department of Commerce. It describes briefly the different processes for making carbon black with emphasis on water needs and the increasing importance of water to the industry resulting from the change in methods of manufacture.

Issued as Geological Survey Water-Supply Paper 1330-B, the publication contains six illustrations and five tables. Copies may be obtained for 20 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Clark Bros. Manufacture New Gas Turbine

CLARK Bros. Company of Olean, New York, has announced that it will manufacture the Ruston Mark TA Gas Turbine under an agreement with Ruston-Hornsby Ltd. of Lincoln, England. The unit, which was recently demonstrated at Olean, develops 1130 horsepower. It may be applied to stationary or portable power generation and to marine and industrial mechanical drives. The Mark TA is well suited to gas and fluid transmission, the company pointed out, as well as to processes where power is required and where exhaust energy can be used for pre-heating or for generation of steam. More than forty of these turbines are presently in operation driving generators, pumps, and centrifugal compressors. Clark Bros. will begin shipments of the unit in September of this year. It will be priced at approximately $100 per horsepower.

Outstanding features of the Mark TA are compactness, light weight, portability, low maintenance with ease of accessibility, air cooling, fuel flexibility, and long life. The turbine operates on a simple, open cycle, is a dual shaft, and has a nominal output speed of 6000 rpm. This speed may be reduced for driving 50 or 60 cycle generators and for other applications. Thermal efficiency at full load is 15.1 per cent. The complete turbine unit is 16 feet long and weighs about 6 tons, which is about one-third the weight of other prime movers of comparable horsepower. The unit is designed to use either gaseous fuels or fuel oils. Conversion from one fuel to another can be accomplished in a matter of minutes.

The turbine consists of high and low pressure units. The high pressure turbine driving the axial compressor operates at a speed of 11,500 rpm. The low pressure turbine turns at 6000 rpm. The inlet temperature is held down to 1340° F, conducive to long life and dependability. Waste heat may be recovered by a regenerator to afford maximum fuel economy. The unit produces very little vibration and surprisingly little exhaust noise. The design permits full load within two minutes after starting. Flexibility of ducting arrangement and combustion chamber location permits the Mark TA to be installed in a variety of locations as requirements demand.

Northern States Power to Build $24,000,000 Plant

NORTHERN States Power Company announced recently that it will build a 150,000-kilowatt generating unit at its big power plant in St. Paul at a cost of $24,000,000.

Allen S. King, president, said construction of "the largest generating unit in the Mid-West" will get under way this fall and is slated for completion in late 1959.

Northern States Power is constructing a 100,000-kilowatt unit at the power station. When completed this fall it will boost capacity to 300,000 kilowatts, making the plant the largest in the utility's four-state system, he noted.

"Stringin' Along With Pengo"

A NEW nine minute 16mm color sound movie showing controlled tension stringing of overhead power lines is available to the utilities industry. Entitled "Stringin' Along With Pengo," the new film shows in detail the Bechtel Corporation stringing 1,033,500 CM grease-impregnated ACSR on a twin circuit tower line, the most important feature of which is the use of the Pengo tension wire stringers. The line was constructed for the Southern California Edison Company in the City of Los Angeles. Film is available from Peterson Engineers Company, Inc., Santa Clara, California.

San Diego Gas & Electric Continues Expansion Program

ANOTHER stage in the careful planned expansion program of the San Diego Gas & Electric Company was reached recently at its Encina power plant in Carlsbad when a second 100,000 kilowatt turbine-generator began supplying electricity to the company's far-flung system. Under construction for two years, this unit cost approximately $12,000,000. Its addition raised the company's total generating capability to 566,000 kilowatts.

Excavation will be started in August on a third multi-million dollar unit which will also house a 106,000 kilowatt turbine-generator. This is scheduled to be ready in 1958.

The San Diego Gas & Electric Company recently purchased 145 acres on the South Bay area of San Diego County. This will serve as the site for the utility's fourth power plant. According to present plans, the first unit at this location will be in operation by 1960 or 1961.

AGA Issues Report On Gas Heating Load Characteristics

THE American Gas Association has released its second report in a series of studies on customer load characteristics. The studies attempt to show the relationship between the quantities of gas used for heating, outside temperature, and hour of the day.

The current report shows results of studies conducted by three utility companies in coöperation with the Bureau of Statistics of A.G.A. While the data shown in the report are applicable only to the utility companies conducting the study, the similarity of results obtained is generally useful to the industry as a whole. Also, the methods employed and the type of problems investigated should be of interest to utilities desiring to conduct similar research.

The first report in the current series published in September, 1955, is still available and copies of the pages on "Studies of the Economics of Gas Householeating and Related Load Characteristics," can be obtained from A. G. A. Bureau of Statistics. Report #1 is priced at $1.00 and the cost of the latest report is $1.50 per copy.

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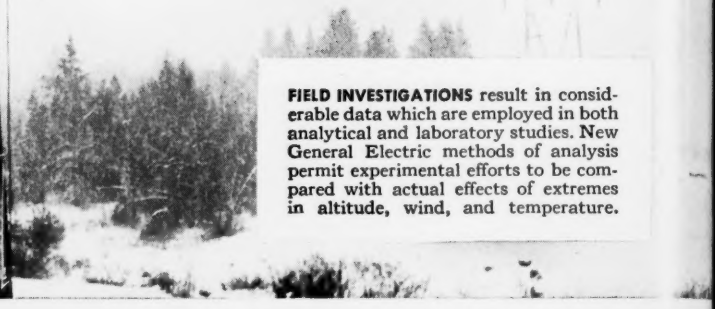

FIELD INVESTIGATIONS result in considerable data which are employed in both analytical and laboratory studies. New General Electric methods of analysis permit experimental efforts to be compared with actual effects of extremes in altitude, wind, and temperature.

What's being done about radio interference?

TUDYING FIELD NOISE TEST DATA in a radio-oise-free shielded room in the General ngineering Lab in Schenectady are Dr. G. . Adams, Analytical Engineering; N. R. chultz, Engineering Planning and Develop-ent; H. A. Gauper, Jr., General Engineer-ng Laboratory.

ETTER CONDUCTOR ARRANGEMENTS are ought in another, larger shielded room in eneral Electric's High Voltage Laboratory Pittsfield, Mass., by Dr. Tseng-Wu Liao, . E. McDonough, and W. A. Keen, Jr.

New methods of analysis may lead to improved accuracy in planning high-voltage transmission systems

As electric utilities respond to demands for larger and larger blocks of power by favoring higher transmission voltage, it's natural for system design engineers and public relations men to ask: how accurately can radio noise be predicted for new line designs at various weather and atmospheric conditions?

For many years, this problem had been researched by utility companies and manufacturers. However, there had been little correlation between lab tests and actual field experience because of the problem's complex variables.

New General Electric methods of analysis not only permit such correlation, but now make it possible to accurately predict interference of actual lines from lab tests of samples of conductors.

Dual conductors, for example, had considerably lower interference levels than conductor surface voltage gradients would indicate. Recent G-E research fully explains this phenomenon, and results correlate with field experience.

Since radio interference is primarily a function of weather and time on a given line, spot testing the actual line for reliable data is very difficult. Thus laboratory techniques and accurate methods of analysis become essential to compare effects of line construction, conductor size, phasing arrangements, etc. so that utilities have a reliable indication of the characteristics of a proposed transmission line.

Continuing research by General Electric promises to speed progress on the radio interference problem and help utilities meet expanding loads without disturbing high public relations standards. Write for "Recent Radio Interference Investigation on High Voltage Transmission Lines," and "Relationship between Corona and Radio Noise on Transmission Lines, Part I," General Electric, Sec. 301-321, Schenectady 5, N.Y.

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